DOCUMENT RESUME

ED 311 238 CE 053 238

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TITLE Apprentice Preparation Program.
INSTITUTION Arctic Coll., Arviat (Northwest Territories).
PUB DATE Nov 88
NOTE 122p.
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Adult Basic Education; *Apprenticeships; Communication (Thought Transfer); *Communication Skills; Course Content; Disadvantaged Youth; Educationally Disadvantaged; *Education Work Relationship; Lesson Plans; Postsecondary Education; *Program Effectiveness; *Science Instruction; *Trade and Industrial Education; Work Experience Programs

ABSTRACT

An apprenticeship preparation program was conducted at Arctic College, Eskimo Point, Northwest Territories, Canada, to overcome young people's educational limitations by offering professional training in a vocational area followed by a combination of work experience and academic upgrading. The academic upgrading stressed computer-assisted learning. The project was successful in four ways: (1) all eight original trainees completed the program; (2) two housing units were completely renovated; (3) the average academic level increase was 1.1 grades; and (4) positive attitudes toward learning were developed. The program, perhaps because it was too short, was unable to prepare any of the trainees for the Trades Entrance Examination. (Most of this package consists of the materials used to conduct the two courses of the program, communications and science. Course summaries, weekly course outlines, lesson plans, tests, and, for the science course, laboratory procedures and materials costs are provided. The packet also includes weekly schedules and a 17-item bibliography.) (KC)

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APPRENTICE PREPARATION PROGRAM

PREPARED
BY

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FROM

COURSE MATERIALS AND
NOTES DEVELOPED DURING
THE COURSE
AUGUST 02 - OCTOBER 21, 1988

FOR

ARCTIC COLLEGE
ESKIMO POINT, N.W.T.

NOVEMBER 1988

U.S. DEPARTMENT OF EDUCATION
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APPRENTICE PREPARATION PROGRAM

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APPRENTICE PREPARATION PROGRAM

ABSTRACT

Many of the young people of Eskimo Point have little formal education. Employment opportunities for this group, predominantly male, have been short-term labour positions which provided only a minimum of professional training and experience.

Vocational trades are one of the few areas that this group perceives as legitimate labour. The lack of academic prerequisites, however, inhibit them from entering career paths as apprentices.

The Apprentice Preparation Program attempted to overcome these limitations by offering professional training in a vocational area followed by a combination of work experience and academic upgrading. The academic upgrading stressed Computer Assisted Learning (CAL).

It achieved success in a number of areas:

1. all 8 original trainees completed the program with an average attendance of 97%;

2. 2 housing units were completely renovated to a standard well above what was initially expected;

3. the average academic level increase was 1.1 grades as measured by the Test of Adult Basic Education (TABE); and

4. attitudes towards learning, as tested by an external evaluator, were positive.

The program was unable to successfully prepare any of the trainees for the Trades Entrance Examination. This goal may not have been realistic as it tests material at a Grade 10 level and the average academic entry level was 6.45 (TABE). A longer program is required.

APPRENTICE PREPARATION PROGRAM

The Apprentice Preparation Program was an innovative attempt to provide professional trades training in combination with academic upgrading delivered in a community setting. It was made possible through the joint efforts of the Eskimo Point Housing Association, Canada Employment, and Arctic College.

The program's goal was to prepare the students for the Apprentice Trades Entrance Examination and to provide professional instruction in housing renovation work. Its duration was 16 weeks; 4 weeks of full-time technical training followed by 12 weeks of combined academic instruction and work experience.

The technical training consisted of 1 week of site preparation followed by a 3 week painting and drywall course. Eskimo Point Housing Association provided the work sites and materials while Arctic College was responsible for the technical instructor. Funding support, in the form of wage allowances and program cost support, was provided by Canada Employment.

The academic training concentrated on mathematics, science, and technical information that the student would require to pass the trades examination. This training was delivered by Arctic College and used a Computer Assisted Learning (CAL) System called PLATO.

There were no entrance requirements for the program but students with a reading comprehension level of 5.0 (TABE) and basic math skills were preferred.

A listing of the total hours and manner of delivery for each of these subject areas was as follows:

Site Preparation	Housing Association	40.00 hrs.
Drywall Course	Arctic College Instructor	120.00 hrs.
Mathematics	Computer Assisted Learning	68.75 hrs.
Silent Reading	Self Directed	13.75 hrs.
Communications	Classroom Instruction	65.00 hrs.
Science	Classroom Instruction	11.25 hrs.
Math	Classroom Instruction	20.00 hrs.
Study Period	Self Directed	27.50 hrs.
First Aid	Classroom Instruction	40.00 hrs.
Job Site Work	Housing Association	220.00 hrs.
Coffee Period		13.75 hrs.
Total		640.00 hrs.

Background:

Historically, many of the building projects in Eskimo Point have been constructed by outside contractors. Although these contractors did hire a significant proportion of local labour, the nature of the jobs was such that the local hires were fundamentally labourers who received minimal, if any, professional training over and above the development of work habits and basic tool handling. As a result, the community has a segment of unskilled construction labourers who are obvious candidates for further training.

This group, predominantly male, have not had success in the formal education system. Most have dropped out of school before obtaining any certification. Literacy and numeracy skills are low and there is little desire to return to a classroom environment.

There is, however, a strong desire for employment in the wage economy. It is mainly directed towards positions in the vocational fields as there exists a strong sex-stereotype on the kinds of jobs that "men" can do. Most of the full-time positions in these fields require a minimum of a Grade 10 standing.

There is a need to provide both professional and academic training to this group so that they can more effectively participate in the wage economy.

Course Descriptions:

Apart from the Painting and Drywall Course, the students spent half of their time in the classroom and half on the work site. A brief description of the activities are outlined below. More detailed descriptions, including Course Summaries, Schedules, and Lesson Plans are contained in the attached sections.

MATHEMATICS:

The students were required to take a mathematics placement test on the PLATO CAL system. It indicated their starting level and provided the information for the instructor to tailor-make their computer learning. The students were also given a Test of Adult Basic Education (TABE, 1970 edition) pre-test.

The computer provided most of the instruction. Supplementary exercises were given, on an individual basis, depending upon the needs of the student.

SILENT READING:

Fifteen minutes a day was set aside for silent, uninterrupted reading. The students chose various reading materials such as books, magazine, newspapers, or technical resources.

COMMUNICATIONS:

The communication class was orientated towards developing the English language skills that the student will require on the work site. It concentrated on exercises from Shoptalk and Marsh's book on Reading and Understanding Technical Information. Learning Guides from the TRAC Common Core were used to illustrate technical information related to the carpentry field.

Because of the short length of the program, we were unable to complete the entire communications course. Complete course outlines and lesson plans are contained in the attached sections.

SCIENCE:

The science program followed the outline provided by the Apprenticeship Board on the Northwest Territories. Again, due to the short duration of the course, not all the material was covered.

A complete description of the science program, including the course outline, lesson plans, investigations, materials list, and tests are included in the attached sections.

MATH CLASS:

The classroom math concentrated on the Metric and Imperial systems of measurement, as well as area and perimeter problems. Methods used to tackle word problems were dealt with as well.

Evaluation:

The main means of evaluating the students' progress were:

Self-Tests
Bi-weekly Quizzes
Science Tests
Trades Examination
Pre- and Post-TABE
Computer Tracking
Attendance
Course-end Attitudinal Tests

The following table outlines the results of the tests for the 8 students. Self-tests were taken from the TRAC Common Core material. The Bi-weekly quizzes and Science tests are attached to the following sections.

The Trades' Entrance Examination is set by the Apprenticeship Board. Student results were as follows:

Stud-1: 35%	Stud-5: 46%
Stud-2: 41%	Stud-6: 32%
Stud-3: 30%	Stud-7: 40%
Stud-4: 50%	Stud-8: 30%

PLATO has an extensive tracking system that daily monitors the student's progress. The instructor had access to the monitoring and used the results to design specific review or supplementary materials for the student.

Attendance was taken in the classroom and on the work site. The results were positive with an average attendance rate of 97%. All 8 students who began the program were able to finish.

Each of the students was required to write a pre- and post-TABE. The results showed an average increase of 1.1 grade levels over the length of the program.

As part of the CAL PLATO innovation, the students also completed a course-end questionnaire on the training. These results are still being compiled by an external evaluator but the initial attitudinal data suggests that this type of instruction was well accepted by the participants.

Apprentice Preparation Program

Self Test Mark Summary

Test	Total	Stud-1	Stud-2	Stud-3	Stud-4	Stud-5	Stud-6	Stud-7	Stud-8	Class Average
F1-1	12.00	4.00	7.00	9.00	6.00	6.00	9.00	7.00		6
F1-2	8.00	0.00	3.00	8.00	1.00	7.00	6.00	2.00	4.00	4
F1-3	5.00	1.00	4.00	5.00	2.00	2.00	5.00	3.00	1.00	3
F1-4	6.00	4.00	6.00	6.00	1.00	5.00	5.00	5.00	2.00	4
F1-5	4.00	2.00	3.00	4.00	1.00	4.00	4.00	3.00	1.00	3
F1-6	5.00	4.00	4.00	3.00	4.00	2.00	4.00	3.00	1.00	3
F1-7	4.00	2.00	4.00	4.00	4.00	3.00	4.00	3.00	3.00	3
G1-6	3.00	5.00	7.00	7.00	3.00	9.00	7.00	5.00	5.00	6
G1-4	11.00	4.00	9.00	6.00	4.00	10.00	9.00	9.00	5.00	7
G1-7	10.00	8.00	8.00	10.00	7.00	10.00	9.00	8.00	6.00	8
G2-1	8.00	3.00	5.00	6.00	3.00	6.00	7.00	5.00	2.00	5
G2-4	9.00	3.00	3.00	7.00	3.00	6.00	7.00	4.00	3.00	5
I1-1	13.00	6.00	7.00	7.00	8.00	7.00	8.00	6.00	4.00	7
D1-1	30.00	8.00	25.00	8.00	14.00	24.00	21.00	21.00	4.00	16
Total #	128.00	54.00	95.00	90.00	61.00	101.00	105.00	84.00	84.29	84
Average %	100.00	42.19	74.22	70.31	47.66	78.91	82.03	65.63	65.85	66

Bi-Weekly Quiz Scores

Test	Total	Stud-1	Stud-2	Stud-3	Stud-4	Stud-5	Stud-6	Stud-7	Stud-8	Class Average
Quiz #1	%	44	76	83	61	87	73	79	74	72.13
Quiz #2	%	56	76	81	67	75	77	82	67	72.63
Quiz #3	%	58	57	67	68	69	54	72	47	61.50
Quiz #4	%	67	61	58	71	76	71	89	61	69.25
Average		56.25	67.50	72.25	66.75	76.75	68.75	80.50	62.25	68.88

Science Tests

Test	Total	Stud-1	Stud-2	Stud-3	Stud-4	Stud-5	Stud-6	Stud-7	Stud-8	Class Average
Test #1	%	21	57	58	50	50	36	68	43	47.88
Test #2	%	40	35	35	35	55	40	40	35	39.38
Average	%	30.50	46.00	46.50	42.50	52.50	38.00	54.00	39.00	43.63

OVERALL AVERAGE	Stud-1	Stud-2	Stud-3	Stud-4	Stud-5	Stud-6	Stud-7	Stud-8	Class Average
Self Tests and Quiz Scores	49.22	70.86	71.28	57.20	77.83	75.39	73.06	64.05	67.36

OVERALL AVERAGE									Class Average
Self Tests, Quiz Scores and Science	42.98	62.57	63.02	52.30	69.39	62.93	66.71	55.70	59.45

Conclusions:

The program achieved success in many areas:

1. All 8 original trainees completed the program with average attendance rates of 97%.

2. Two housing units were completely renovated to a standard well above what was initially expected.

3. The average academic level increase was 1.1 grades.

4. Seven of the 8 trainees found employment or have registered for further training.

Although none of the trainees were successful on the Trades' Entrance Examination, it was not realistic to expect this result. The examination tests material at a Grade 10 level and the average entry level was 6.45 (TABE). A longer program is required.

WEEKLY SCHEDULES

SCHEDULE FOR WEEK 1

MORNING GROUP

TIME	DAY MON.	TUES.	WED.	THURS.	FRI.
8:00 - 8:30	STUDY				
8:30 - 9:45	COMMUNICATIONS				
9:45 - 10:00	DIRECTED READING				
10:00 - 10:15	COFFEE BREAK				
10:15 - 11:30	CAL MATH				
11:30 - 12:00	MATH CLASS				
1:00 - 2:15	FIRST AID COURSE				
2:15 - 5:00	WORK AT JOB SITE				

AFTERNOON GROUP

TIME	DAY MON.	TUES.	WED.	THURS.	FRI.
8:00 - 12:00	WORK AT JOB SITE				
1:00 - 2:15	FIRST AID COURSE				
2:15 - 2:30	DIRECTED READING				
2:30 - 3:00	MATH CLASS				
3:00 - 3:15	COFFEE BREAK				
3:15 - 4:30	CAL MATH				
4:30 - 5:00	STUDY				

APPRENTICE PREPARATION PROGRAM
WEEKLY SCHEDULES

SCHEDULE FOR WEEKS 2 - 8

MORNING GROUP

TIME	DAY MON.	TUES.	WED.	THURS.	FRI.
8:00 - 8:30	STUDY				
8:30 - 9:45	COMMUNICATIONS				
9:45 - 10:00	DIRECTED READING				
10:00 - 10:15	COFFEE BREAK				
10:15 - 11:30	CAL MATH				
11:30 - 12:00	MATH CLASS				
1:00 - 5:00	WORK AT JOB SITE				

AFTERNOON GROUP

TIME	DAY MON.	TUES.	WED.	THURS.	FRI.
8:00 - 12:00	WORK AT JOB SITE				
1:00 - 2:15	COMMUNICATIONS				
2:15 - 2:30	DIRECTED READING				
2:30 - 3:00	MATH CLASS				
3:00 - 3:15	COFFEE BREAK				
3:15 - 4:30	CAL MATH				
4:30 - 5:00	STUDY				

APPRENTICE PREPARATION PROGRAM
WEEKLY SCHEDULES

SCHEDULE FOR WEEKS 9 - 11

MORNING GROUP

TIME	DAY MON.	TUES.	WED.	THURS.	FRI.
8:00 - 8:30	STUDY				
8:30 - 9:45	CAL MATH				
9:45 - 10:15	COMMUNICATIONS				
10:15 - 10:30	DIRECTED READING				
10:30 - 10:45	COFFEE				
10:45 - 11:15	COMMUNICATIONS				
11:15 - 12:00	SCIENCE				
1:00 - 5:00	WORK AT JOB SITE				

AFTERNOON GROUP

TIME	DAY MON.	TUES.	WED.	THURS.	FRI.
8:00 - 12:00	WORK AT JOB SITE				
1:00 - 2:15	CAL MATH				
2:15 - 2:30	DIRECTED READING				
2:30 - 2:45	COFFEE				
2:45 - 3:30	SCIENCE				
3:30 - 4:30	COMMUNICATIONS				
4:30 - 5:00	STUDY				

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APPRENTICE PREPARATION PROGRAM

COMMUNICATIONS COURSE SUMMARY

COMMUNICATIONS

UNIT ONE	HOW TO STUDY
UNIT TWO	THE BASICS OF UNDERSTANDING TECHNICAL WORK
UNIT THREE	WHAT IS TECHNICAL INFORMATION
UNIT FOUR	UNDERSTANDING WORDS
UNIT FIVE	WORDS GROWING INTO SENTENCES AND PARAGRAPHS
UNIT SIX	TECHNICAL INFORMATION AND DRAWINGS
UNIT SEVEN	REMEMBERING TECHNICAL INFORMATION
UNIT EIGHT	LOGICAL THINKING
UNIT NINE	MAKING THE CORRECT DECISIONS
UNIT TEN	READING AND UNDERSTANDING DRAWINGS
UNIT ELEVEN	COMMUNICATING YOUR IDEAS
UNIT TWELVE	TECHNICAL INFORMATION SHOULD NEVER BE.....

UNIT ONE
HOW TO STUDY
3 LESSONS

OBJECTIVE: INTRODUCE GOOD STUDY HABITS

- THE NOTE BOOK
- TAKING NOTES
- REVIEW AND OTHER STUDY TECHNIQUES
- STUDY ENVIRONMENT
- INTRODUCE PARTS OF A BOOK AND WAYS OF FINDING INFORMATION
- HOW TO USE REFERENCE BOOKS AND INDICES

UNIT TWO
THE BASICS OF UNDERSTANDING TECHNICAL WORK
6 LESSONS

OBJECTIVE: GENERAL SUBJECT INTRODUCTION AND THE APPLICATION OF STUDY TECHNIQUES

- THE 5 W'S AND H TECHNIQUE FOR READING INFORMATION AND FOLLOWING DIRECTIONS
- INTRODUCE INSTRUCTIONS, DIRECTIONS AND DECISIONS
- READ DIRECTIONS IN MANUALS, COOKBOOKS, MAGAZINES AND IDENTIFY KEY WORDS FOR NOTE TAKING
- RESOURCES - READERS' DIGEST REPAIR MANUAL
- USE OF DICTIONARY TO DEFINE TERMS AND LABEL PARTS
- LESSON ON LOGICAL ORDER (TIE MY SHOES, START A HONDA)

UNIT THREE
WHAT IS TECHNICAL INFORMATION
5 LESSONS

OBJECTIVE: FURTHER PRACTICE IN IDENTIFYING TECHNICAL INFORMATION AND INTRODUCE MEASUREMENT

- DEFINE TECHNICAL INFORMATION
- INTRODUCE VOCABULARY BUILDING EXERCISES
- LEARNING RESOURCE GUIDE G - PARTS OF POWER TOOLS
- INTRODUCE BASIC SCIENTIFIC MEASUREMENT
- VOCABULARY BUILDER - SHOPTALK CHAPTER 2 - USEFUL WORDS
- EXERCISE EXAMPLES FROM MARSH - 2 LESSONS

UNIT FOUR
UNDERSTANDING WORDS
6 LESSONS

OBJECTIVE: INTRODUCTION TO TYPES OF TECHNICAL JARGON AND MEASUREMENT CONTINUES

- VOCABULARY BUILDER - SHOPTALK CHAPTER 3 - USEFUL WORDS
- USE EXAMPLES OF GREEK AND LATIN STEMS AS AN INTRODUCTION TO ACCURACY IN NAMING
- EXERCISE EXAMPLES FROM MARSH
- INTRODUCE TRADES MEASUREMENT UNITS

UNIT FIVE
SENTENCES AND PARAGRAPHS
5 LESSONS

OBJECTIVE: TECHNICAL JARGON IN CONTEXT

- VOCABULARY BUILDER - SHOPTALK CHAPTER 4 - USEFUL WORDS
- REVIEW LOGIC SEQUENCE EXERCISE FROM ABE WRITING
- PREVENTATIVE MAINTENANCE EXERCISE IN SHOPTALK - P. 57
- LEARNING GUIDE G - PARTS OF POWER TOOLS
- EXERCISES IN MARSH

UNIT SIX
UNDERSTANDING AND EXPLAINING TECHNICAL INFORMATION AND DRAWINGS
6 LESSONS

OBJECTIVE: TO INTRODUCE THE VARIOUS METHODS TECHNICAL INFORMATION CAN BE PICTORIALLY REPRESENTED

- VOCABULARY BUILDER - SHOPTALK CHAPTER 5 - REPAIR AND REMODEL
- INTRODUCE WITH SIGNS AROUND THE TOWN - AIRLINES, SMOKING,
- 3 DIMENSIONAL DIAGRAMS
- SEE LEARNING GUIDE D - SKETCH AND READ DRAWINGS
- FOLLOW SELECTED LESSONS IN TEXT WHICH IDENTIFY DIFFERENT TRADE SYMBOLS
- CONTINUE TO USE THE RESOURCES - LEARNING GUIDE D, F, AND G

UNIT SEVEN
REMEMBERING TECHNICAL INFORMATION
3 LESSONS

OBJECTIVE: HOW TO IDENTIFY, ORGANIZE AND RECALL BASIC PROJECT INFORMATION

- REVIEW ORDERING AND LOGIC SEQUENCE
- REVIEW HOW TO STUDY
- PRESENT LESSONS IN MARSH UNIT
- MEASUREMENT REVIEW

UNIT EIGHT
LOGICAL THINKING
2 LESSONS

OBJECTIVE: LEARNING TO ASSOCIATE RELEVANT INFORMATION

- VOCABULARY BUILDER AND LOGIC LESSON COMBINES
- INFORMATION ASSOCIATION
- PRESENT UNIT IN MARSH
- PRACTICE FOR THE LOGIC SECTION OF TRADES EXAM - USE MARSH P. 52 - 54 AS A SAMPLE TEST

UNIT NINE
MAKING THE CORRECT DECISION
2 LESSONS

OBJECTIVE: ORGANIZING INFORMATION TO MAKE A DECISION

- REVIEW THE 5 W'S AND H AND A BLACK AND DECKER PLAN BOOK SHOWING PROJECT MATERIAL LISTS OR MAGAZINE PROJECTS
- PRESENT LESSONS IN MARSH FOR PRACTICE

UNIT TEN
READING AND UNDERSTANDING DRAWINGS
7 LESSONS

OBJECTIVE: LEARNING TO READ AND UNDERSTAND DRAWINGS USED IN THE TRADES AREA

- APPLICATION OF LOGIC AND ORDER SEQUENCE
- REVIEW EXERCISES IN MARSH
- ASSIGN SHARON TROKE'S MATERIAL AND DIAGRAMS FOR HOMESTUDY AND MEASUREMENT

UNIT ELEVEN
COMMUNICATING YOUR IDEAS
1 LESSON

OBJECTIVE: GIVING AND RECEIVING CLEAR INSTRUCTIONS

- APPLY CONCEPTS PRESENTED IN PREVIOUS LESSONS IN A WRITING EXERCISE
- PRESENT EXERCISES IN MARSH

UNIT TWELVE
TECHNICAL INFORMATION SHOULD NEVER BE FRIGHTENING OR BORING
1 LESSON

OBJECTIVE: SUMMARY AND REVIEW

- TAKE CONCEPTS AND APPLY TO TRADES EXAM MATERIALS AND TIME TO COINCIDE WITH THE TRADES EXAM
- PRESENT LESSON IN MARSH

APPRENTICE PREPARATION PROGRAMME
LESSON PLANS FALL 1988

UNIT NUMBER: ONE

LESSON NUMBER: ONE

LESSON OBJECTIVE: BASIC READING, LISTENING, AND OBSERVATION

MATERIAL NEEDED: NOTE BOOKS, PENCILS, ARTICLE TO READ AND SUMMARIZE, NOTEMAKING (DIANE BROWN)

VOCABULARY: READING, WRITING, LISTENING, OBSERVING, MEMORIZE, RECALL, SUMMARIZE, ORGANIZE, SYNTHESIZE, OUTLINE

MOTIVATION: SHOW STUDENTS A VERY BUSY AND DETAILED LARGE PHOTOGRAPH. HAVE THEM LIST THE ITEMS WHICH APPEAR IN PART OF THE PHOTOGRAPH. COMPARE STUDENTS LIST WITH ACTUAL PHOTOGRAPH. INTRODUCE BASIC CONCEPTS.

LNSTRUCTION: DISCUSS WITH STUDENTS THE BASIC CONCEPTS OF READING, LISTENING, AND OBSERVING TO ABSORB INFORMATION. READ AN ARTICLE ABOUT A TECHNICAL SUBJECT AND HAVE THEM LIST THE KEY WORDS. DISCUSS AND COMPARE LISTS.

SUMMARIZE AND PRESENT APPROPRIATE METHODS OF NOTETAKING AS OUTLINED IN BROWN P. 1-25.

FOLLOW-UP: ASSIGN AS HOMEWORK A XEROXED ARTICLE WHERE THE MAIN IDEA AND KEY WORDS MUST BE LISTED, HIGHLIGHTED OR UNDERLINED.

UNIT NUMBER: ONE

LESSON NUMBER: TWO

LESSON OBJECTIVE: IDENTIFY A GOOD STUDY ENVIRONMENT AND APPLY GOOD STUDY HABITS FOR A DAILY REVIEW AND IN AN EXAMINATION SITUATION.

MATERIAL NEEDED: BROWN (AS ABOVE) P. 164-174

VOCABULARY: STUDY ENVIRONMENT, REVIEW, KEY-NOTES

MOTIVATION: SHOW A VIDEO TAPE, RUN THE RADIO AND PRESENT A DIFFICULT SCIENCE LESSON, SUCH AS PHOTOSYNTHESIS, AND ASK STUDENTS TO TAKE KEY WORD NOTES. (OR REVIEW THE STUDENTS HOMEWORK ASSIGNMENT REVIEW YOUR NOTES AND THE STUDENTS.) DISCUSS HOW EFFECTIVE A DISTRACTION THE TELEVISION AND RADIO PRESENTED TO THE PRESENTATION. ASK STUDENTS WHAT PRODUCES AN IDEAL STUDY ENVIRONMENT. LIST THESE CHARACTERISTICS ON THE CHALKBOARD.

INSTRUCTION: PRESENT BROWN P. 164 ON YOUR STUDY LOCATION

SUMMARIZE AND PRESENT BROWN ON REVIEWING NOTES TECHNIQUE AND STUDYING FOR AN EXAMINATION.

FOLLOW-UP: REVIEW NOTE TAKING, GOOD STUDY HABITS AND THE STUDY ENVIRONMENT.

UNIT NUMBER: ONE

LESSON NUMBER: THREE

LESSON OBJECTIVE: FIND INFORMATION IN DIFFERENT TYPES OF REFERENCE TEXTS AND TAKE RESEARCH NOTES.

MATERIAL NEEDED: VARIOUS TECHNICAL TEXTS WITH INFORMATION OF INTEREST TO THE STUDENT SUCH AS A SET OF ENCYCLOPEDIA, A CARPENTRY MANUAL, A PETERSON WILDLIFE GUIDE, SIR OR SEARS CATALOGUE

VOCABULARY: CHAPTER HEADING, INDEX, TABLE OF CONTENTS, INDICES, SUMMARY,

MOTIVATION: BRIEFLY SUMMARIZE THE RESOURCE MATERIALS WITH THE STUDENTS AND ASK THEM TO ANSWER THE FOLLOWING LIST OF QUESTIONS IN A BRIEF PERIOD OF TIME.

WHAT IS THE LONGEST RIVER IN THE WORLD?
WHAT IS THE POPULATION OF CANADA?
WHAT DOES A BEVEL GAUGE MEASURE?
WHERE DO ARCTIC TERNS SPEND THE WINTER?
WHAT IS THE SPEED OF LIGHT?
WHO INVENTED THE TELEPHONE?
WHEN WAS THE FIRST ATOMIC BOMB TESTED?

INSTRUCTION: AS THE STUDENT FINDS THE INFORMATION ON HIS OWN, HE SHOULD BECOME AWARE OF THE USE OF AN INDEX AND TABLE OF CONTENTS AND OF THE GENERAL SUBJECT MATTER OF THE REFERENCE MATERIALS.

REVIEW EACH ANSWER WITH THE STUDENTS AND NOTE TO THEM THAT THE INDEX AND SUBJECT INDEX OF THE ENCYCLOPEDIA IS AN IMPORTANT ROUTE TO FINDING GENERAL INFORMATION. USE THE INDEX AND TABLE OF CONTENT SECTIONS OF THE OTHER REFERENCE TEXT.

FOLLOW-UP: ASSIGN AN EXERCISE FROM POPULAR MECHANICS MAGAZINE AUG 88 AND ASK STUDENTS TO IDENTIFY THE SANDER MOST HIGHLY RECOMMENDED BY THE MAGAZINE. WHAT ARE THE CRITERIA BY WHICH THEY TESTED THE PRODUCT.

UNIT NUMBER: TWO

LESSON NUMBER: ONE

LESSON OBJECTIVE: PRACTICE THREE SKILLS TO UNDERSTAND TECHNICAL INFORMATION: READING INFORMATION, FOLLOWING DIRECTIONS AND MAKING DECISIONS.

MATERIAL NEEDED: MARSH 1986:1, ABE COMMUNICATIONS P. 15-24, NEWS NORTH, NUNATSIAQ NEWS

VOCABULARY: WHO, WHAT, WHERE, WHEN, WHY, AND HOW; DIRECTIONS

MOTIVATION: ON FLASH CARDS MAKE A LIST OF THREE NAMES, ACTIONS WORDS, LOCATIONS, TIMES AND REASONS. HAVE THE STUDENTS PLACE THESE TOGETHER TO TELL A BRIEF STORY. SUCH AS JOHN, HAPPY, SCHOOL, LABOUR DAY, WON RACE ETC...

INSTRUCTION: REVIEW THE HEADLINES AND FIRST PARAGRAPHS OF A NUMBER OF NEWS PAPER ARTICLES IN NEWS NORTH AND NUNATSIAQ NEWS. LEAD STUDENTS TO RECOGNIZE, IDENTIFY AND LIST THE TYPE OF INFORMATION CONSISTENTLY BEING PRESENTED.

THE 5W AND H METHOD AS A WAY OF COLLECTING AND PRESENTING INFORMATION

REVIEW THE FIVE W'S AND H IN THESE ARTICLES. PLACE ABOVE FLASH CARDS WITH WORDS IN THE 5 W AND H CATEGORY. STRESS THAT THIS IS A WAY OF ORGANIZING AND PRESENTING INFORMATION, WHETHER TECHNICAL OR AS A STUDY HABIT.

INFORMATION CAN BE ORGANIZED IN MANY WAYS. A LOGICAL SEQUENCE OF EVENTS IS VERY IMPORTANT. INTRODUCE EXERCISE ONE IN MARSH ON DIRECTIONS. A LIST OF DIRECTIONS IS A LOGIC SEQUENCE.

HAVE STUDENTS WRITE BRIEF DIRECTIONS TO A STRANGER DRIVING FROM THE ARCTIC COLLEGE BUILDING TO THE GOVERNMENT OFFICE OR ANY APPROPRIATE TASK.

FOLLOW-UP: CONTINUE TO NEXT LESSON

UNIT NUMBER: TWO

LESSON NUMBER: TWO

LESSON OBJECTIVE: PRACTICE THREE SKILLS TO UNDERSTAND TECHNICAL INFORMATION.

MATERIAL NEEDED: MARSH

VOCABULARY: KEY WORDS

MOTIVATION: NOT NECESSARY - BUT HAVE STUDENTS ATTEMPT A TASK WHICH IS UNFAMILIAR TO THEM BY FOLLOWING DIRECTIONS. FOR EXAMPLE HAVE THEM REMOVE THE LOCAL LIBRARY ON THE COMPUTERS AND LOAD FIRST CHOICE TO FIND A LETTER YOU HAVE WRITTEN TO THEM.

INSTRUCTION: CONTINUE WITH THE DIRECTIONS EXERCISE IN MARSH. WHILE REVIEWING EACH SET OF DIRECTIONS HAVE THEM IDENTIFY AND UNDERLINE THE KEY WORDS. CONTINUE TO STRESS LOGICAL ORDER AS IT WILL IMPACT DECISION MAKING.

STRESS AS WELL THE DECISION MAKING (WHAT'S NEXT) ASPECT OF EXERCISES.

FOLLOW-UP: HAVE STUDENTS REVIEW MAGAZINES IN THE CENTRE DURING THEIR READING PERIOD FOR INSTRUCTIONS OF ANY TYPE FROM SUBSCRIPTION ORDERING, PROJECT CONSTRUCTION TO COOKING. ASSIGN SHOPTALK P. 49

UNIT NUMBER: TWO

LESSON NUMBER: THREE

LESSON OBJECTIVE: USING LABELLED DIAGRAMS AND A DICTIONARY.

MATERIAL NEEDED: READERS' DIGEST REPAIR MANUAL, ISUMASI MAGAZINE

VOCABULARY: LABEL, DEFINITION

MOTIVATION: COPY THE LABELLED DIAGRAM OF CARIBOU BONES AND PARTS BY ERIC ANOEE FOUND IN ISUMASI MAGAZINE. USE THIS AS A PIECE OF TECHNICAL LITERATURE FOUND IN INUKTITUT. EACH PART HAS A SPECIFIC TITLE. ALTHOUGH NOT A TRADITIONAL METHOD, IT IS A MEANS OF TEACHING AND PRESENTING, OR ORGANIZING, INFORMATION WHICH OTHERS CAN LEARN. LEAD TO A DIAGRAM OF APPROPRIATE TOOL FROM READERS' DIGEST OR LEARNING RESOURCE G-POWER TOOLS. REINFORCE THE POINT THAT THIS IS A SIMILAR WAY OF PRESENTING ANOTHER TYPE OF TECHNICAL INFORMATION.

INSTRUCTION: ON SEVERAL TOOLS HAVE THEM LOCATE AND IDENTIFY BASIC PARTS. ENCOURAGE THE USE OF DICTIONARIES TO DEFINE THE TERMS.

FOLLOW-UP: ASSIGN SHOPTALK P. 35

UNIT NUMBER: TWO

LESSON NUMBER: FOUR

LESSON OBJECTIVE: USING LABELLED DIAGRAMS

MATERIAL NEEDED: MARSH, DIAGRAM OF SNOWMOBILE

VOCABULARY:

MOTIVATION: GIVE STUDENTS A BLANK DIAGRAM OF A SNOWMOBILE AND SEE HOW MANY GENERAL PARTS THEY CAN LABEL.

INSTRUCTION: CONTINUE WITH MARSH EXERCISE

COPY AND ASSIGN MARSH - P. 15-16 EXERCISE 5 -PRACTICE LOCATING INFORMATION.

FOLLOW UP: ASSIGN SHOPTALK P. 36

UNIT NUMBER: TWO

LESSON NUMBER: FIVE

LESSON OBJECTIVE: MAKING DECISIONS BASED ON A LOGICAL SEQUENCE.

MATERIAL NEEDED: MARSH - P. 6, EXERCISE 7, 8, AND 9

VOCABULARY: COMMON SENSE, LOGIC

MOTIVATION: NOT NECESSARY

INSTRUCTION: XEROX AND HAVE STUDENTS COMPLETE EXERCISE 7, 8, AND 9 IN MARSH ON TECHNICAL DRAWINGS.

REVIEW THE USE OF DIRECTIONS, THE SEQUENCE OF LOGICAL ORDER AND HOW WE ARRIVE AT A DECISION. STRESS HOW IMPORTANT BEING ABLE TO COMMUNICATE INFORMATION IS TO THE SUBJECT OF TRADES PROGRAMMES.

HAVE STUDENTS WRITE A SERIES OF INSTRUCTIONS IN NUMBERED SENTENCES TO COMPLETE ONE OR MORE OF THE FOLLOWING TASKS.

STARTING A HONDA ON A COLD MORNING
SETTING NETS ON THE SHORE LINE
CUTTING A SHEET OF PLYWOOD IN HALF

REVIEW. DEMONSTRATE THAT GOOD INSTRUCTIONS HAVE GOOD CLEAR DETAILS AND CAN BE EASILY FOLLOWED. DECISIONS ARE MORE EASILY MADE FROM A GOOD SET OF INSTRUCTIONS.

FOLLOW-UP: WRITE INSTRUCTIONS FOR CUTTING A PIECE OF PLYWOOD

UNIT NUMBER: TWO

LESSON NUMBER: SIX

LESSON OBJECTIVE: USE LABELLED DIAGRAMS

MATERIALS NEEDED: COFFEMAKER, DRILL

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT THE STUDENTS WITH A COFFEMAKER AND A DRILL AND HAVE THEM DO A SCHEMATIC DRAWING LABELLING ALL THE PARTS. THE STUDENTS SHOULD DEMONSTRATE THE USE OF THE DRILL AND COFFEEMAKER.

FOLLOW-UP:

UNIT NUMBER: THREE

LESSON NUMBER: ONE

LESSON OBJECTIVE: GAIN FURTHER EXPERIENCE IN THE USE OF TECHNICAL MATERIALS AND LEARN THE BASICS OF MEASUREMENT.

MATERIALS NEEDED: MARSH

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: DEFINE TECHNICAL INFORMATION. DRAW ON PREVIOUS EXAMPLES TO ILLUSTRATE DEFINITION.

USE EXERCISE 1, 2, AND 4 (P. 3 - 9) IN MARSH FOR FURTHER PRACTICE IN IDENTIFYING WHICH SPECIFIC TRADE AREAS USE TECHNICAL INFORMATION.

FOLLOW-UP: ASSIGN SHOPTALK P. 3 - 4

UNIT NUMBER: THREE

LESSON NUMBER: TWO

LESSON OBJECTIVE: GAIN PRACTICE IN THE TERMINOLOGY RELATED TO LAYOUT AND MEASUREMENT TOOLS

MATERIAL NEEDED: LEARNING GUIDE F

VOCABULARY:

MOTIVATION: DISCUSS METHODS OF MEASUREMENT IN SCIENCE AND THE NEED FOR CONSISTENCY AND ACCURACY. ONE OF THE FIRST LESSONS IN THE PHYSICS COURSE- SCIENCE ON PLATO DEALS WITH BASIC MEASUREMENT. DISCUSS WITH STUDENTS TRADITIONAL METHODS OF BODY MEASUREMENT FOR KAYAKS.

INSTRUCTION: USING GUIDE F (P. 3 - 12) SUMMARIZE AND PRESENT BASIC UNITS OF MEASUREMENT IN CONSTRUCTION AND LAYOUT TOOLS. THIS SHOULD ALL BE FAMILIAR TO THE STUDENTS. HAVE STUDENTS PREPARE A DETAILED MEASUREMENT OF AN OBJECT SUCH AS A WOODEN DESK DRAWER OR AUDIO VISUAL STAND.

ASSIGN A GOOD HAND DRAWN COPY WITH MEASUREMENTS FOR A HOMEWORK ASSIGNMENT. THIS WILL FORM THE BASIS OF A FURTHER LESSON ON READING DRAWINGS.

FOLLOW UP: ASSIGN SHOPTALK P. 5

UNIT NUMBER: THREE

LESSON NUMBER: THREE

LESSON OBJECTIVE: TO GAIN FURTHER EXPERIENCE IN THE TERMINOLOGY RELATED TO HAND TOOLS

MATERIALS NEED: VARIOUS HAND TOOLS (AVAILABLE FROM THE CENTRE), MARSH, LEARNING GUIDE F

VOCABULARY: AS IDENTIFIED IN LEARNING GUIDE F

MOTIVATION: NOT NECESSARY

INSTRUCTION: SUMMARIZE AND PRESENT LEARNING TASK 7 (P. 37 - 38) ON THE MAINTENANCE AND CARE OF BASIC CONSTRUCTION HAND TOOLS.

SUMMARIZE LEARNING MATERIALS AND XEROX ILLUSTRATIONS TO PRESENT A CROSS SECTION OF TOOLS TO THE STUDENT.

HAVE STUDENTS PRACTICE A COMPETENCY TEST USING THE TOOLS TO PREFORM VARIOUS MEASUREMENTS.

HAVE STUDENTS COMPLETE EXERCISES # 4 (P. 10) AND 6 (P. 12) IN MARSH ON TECHNICAL INFORMATION.

ASSIGN A WRITING EXERCISE WHERE STUDENTS MUST GENERATE DIRECTIONS FOR USING SPECIFIC MEASURING TOOLS.

FOLLOW UP: ASSIGN SHOPTALK P. 25

UNIT NUMBER: THREE

LESSON NUMBER: FOUR

LESSON OBJECTIVE: GAIN FURTHER EXPERIENCE IN THE TERMINOLOGY RELATED TO HAND TOOLS

MATERIALS NEEDED: LEARNING GUIDE F, MARSH

VOCABULARY: AS IDENTIFIED IN LEARNING GUIDE F

MOTIVATION: NOT NECESSARY

INSTRUCTION: SUMMARIZE AND PRESENT LEARNING GUIDE F (P. 13 - 33) ON HANDSAWS, PLANES AND CHISELS.

HAVE STUDENTS COMPLETE EXERCISE # 4, 5, AND 6 (P. 22 -24) IN MARSH ON TECHNICAL WORDS GROWING INTO TECHNICAL PARAGRAPHS.

STUDENTS SHOULD WRITE A PARAGRAPH EXPLAINING THE USE OF MEASURING TOOLS. (IDEAS - HOW TO MEASURE A COUNTER WITH A STEEL TAPE; USING A LEVEL TO ADJUST A TABLE LEG; WHICH DO YOU PREFER-HAND SAW OR POWER SAW, EMPHASIZE THAT FOR DIFFERENT JOBS DIFFERENT TOOLS ARE BETTER.)

FOLLOW-UP: ASSIGN SHOPTALK P. 26

UNIT NUMBER: THREE

LESSON NUMBER: FIVE

LESSON OBJECTIVE: TO GAIN FURTHER EXPERIENCE IN THE TERMINOLOGY RELATED TO HAND TOOLS

MATERIALS NEEDED: LEARNING GUIDE F

VOCABULARY: AS IDENTIFIED IN LEARNING GUIDE F

MOTIVATION: NOT NECESSARY

INSTRUCTION: SUMMARIZE AND PRESENT LEARNING GUIDE F - ON HAMMERS/MALLETS AND CLAMPS/VICES/MISCELLANEOUS HANDTOOLS. P. 23 - 36)

DISCUSS THE USE OF NOUNS, VERBS, AND ADJECTIVES AND HAVE STUDENTS WRITE SENTENCES USING THEM PROPERLY.

FOLLOW-UP: ASSIGN SHOPTALK P. 27

UNIT NUMBER: FOUR

LESSON NUMBER: ONE

LESSON OBJECTIVE: IDENTIFY DIFFERENT TYPES OF TECHNICAL JARGON AND APPLY CONCEPTS OF MEASUREMENT

MATERIALS NEEDED: MARSH, FRY (THE NEW READING TEACHERS BOOK OF LISTS)

VOCABULARY: READING COMPREHENSION

MOTIVATION: DISCUSS WITH STUDENTS THAT, IN SPORTS, TO DO WELL, YOU MUST HAVE THE BASIC SKILLS AND PERFECT THEM. FOR EXAMPLE IN HOCKEY PASSING AND SKATING ARE VERY IMPORTANT TO BEING ABLE TO GET DOWN THE ICE TO PREFORM THE BIG "SLAP SHOT" ON GOAL. DRAW THE COMPARISON THAT, IN THE TRADES, BEING ABLE TO UNDERSTAND BASIC TERMINOLOGY IS INTRINSIC TO GATHERING INFORMATION, UNDERSTANDING INSTRUCTIONS AND MAKING DECISIONS.

INSTRUCTION: FROM FRY DEMONSTRATE THE USE OF LATIN AND GREEK STEMS IN TECHNICAL WORDS IN ENGLISH. THIS REINFORCES THE SKILLS PRESENTED IN UNIT ONE LESSON THREE.

A GOOD LIST IS THE USE OF TELE; FOR EXAMPLE TELE GRAM (WRITE AT DISTANCE) TELE VISION (SEE AT DISTANCE) TELE PHONE (TALK AT DISTANCE)

LEAD TO A DISCUSSION OF TERMS JUST COMPLETED IN MEASUREMENT. DEMONSTRATE HOME DIFFERENT TYPES OF MEASUREMENT ARE SPECIFIC TO CERTAIN TRADES AND FIELDS IN THE SCIENCES.

USE CARPENTRY AS A DEMONSTRATION AND COMPLETE MARSH P. 16-17 EXERCISE 6

FOLLOW-UP: ASSIGN A ONE PAGE WRITING ASSIGNMENT TELLING ABOUT THE THINGS YOU HAVE DONE THIS PAST WEEK ON YOUR JOB SITE.

UNIT NUMBER: FOUR

LESSON NUMBER: TWO

LESSON OBJECTIVE: USE OF TECHNICAL JARGON

MATERIALS NEEDED: MARSH, ALLYN AND BACON, LEARNING GUIDE G

VOCABULARY: VOCABULARY BUILDER AS APPEARS IN ALLYN AND BACON

MOTIVATION: NOT NECESSARY

INSTRUCTION: CONTINUE WITH EXERCISES IN MARSH.

INTRODUCE VOCABULARY BUILDER OF USEFUL WORDS P. 25 AND 40 FROM ALLYN AND BACON.

SUMMARIZE AND PRESENT LEARNING TASK 3 AND 4 : GUIDE G ON POWER TOOLS.

FOLLOW-UP: ASSIGN SHOPTALK P. 41

UNIT NUMBER: FOUR

LESSON NUMBER: THREE

LESSON OBJECTIVE: USE OF TECHNICAL JARGON

MATERIALS NEEDED: LEARNING GUIDE G, ELLIOT - ENGLISH THE EASY WAY

VOCABULARY: AS IDENTIFIED IN LEARNING GUIDE G

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT AND SUMMARIZE LEARNING GUIDE G: TASK 1- SAFETY PROCEDURES WHEN USING POWER TOOLS (P. 39 - 43).

PRESENT ELLIOT, ENGLISH THE EASY WAY, P. 136 - 137. DISCUSS THE USE OF PREPOSITIONS IN SENTENCES.

FOLLOW-UP: ASSIGN ELLIOT P. 2 - SUBJECT/VERB RECOGNITION

UNIT NUMBER: FOUR

LESSON NUMBER: FOUR

LESSON OBJECTIVE: USE OF TECHNICAL JARGON

MATERIALS NEEDED: LEARNING GUIDE G, ELLIOT,

VOCABULARY: AS IDENTIFIED IN LEARNING GUIDE G

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT AND SUMMARIZE LEARNING GUIDE G: TASK 1 -

POWER SAWS (P. 55 - 59).

CONTINUE WITH DISCUSSION ON PREPOSITIONS IN ELLIOT.

PRESENT ELLIOT P. 209 - SPEECH DUDS. DISCUSS.

FOLLOW-UP: ASSIGN ELLIOT P. 211 - SPEECH DUDS

UNIT NUMBER: FOUR

LESSON NUMBER: FIVE

LESSON OBJECTIVE: USE OF TECHNICAL JARGON

MATERIALS NEEDED: LEARNING GUIDE G, ELLIOT

VOCABULARY: AS IDENTIFIED IN LEARNING GUIDE G

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT AND SUMMARIZE LEARNING GUIDE G: TASK 4 - IDENTIFY DRILL PRESSES.

PRESENT ELLIOT, USE OF CONJUNCTIONS IN SENTENCES. DISCUSS WITH STUDENTS AND HAVE THEM COMPLETE ELLIOT P. 139 ON CONJUNCTION RECOGNITION. DO A WRITING EXERCISE USING CONJUNCTIONS.

FOLLOW-UP: ASSIGN ELLIOT P. 212 - SPEECH DUDS

UNIT NUMBER: FOUR

LESSON NUMBER: SIX

LESSON OBJECTIVE: USE OF TECHNICAL JARGON

MATERIALS NEEDED: SCRABBLE GAME, WORD PUZZLES

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: HAVE STUDENT BREAK INTO 2 TEAMS AND PLAY A GAME OF SCRABBLE WHERE THEY HAVE TO USE TECHNICAL WORDS. BONUS POINTS ARE AWARDED FOR TECHNICAL WORDS.

WORD PUZZLES USING TECHNICAL WORDS FROM SHOPTALK.

FOLLOW-UP: ASSIGN ELLIOT P. 142 - USING CONJUNCTIONS

UNIT NUMBER: FIVE

LESSON NUMBER: ONE

LESSON OBJECTIVE: APPLY NOTE TAKING AND COMPREHENSIVE READING SKILLS TO TECHNICAL JARGON IN CONTEXT

MATERIALS NEEDED: ABE COMMUNICATION, MARSH, ELLIOT

VOCABULARY: AS APPEARS

MOTIVATION: NOT NECESSARY

INSTRUCTION: START WITH MARSH VOCABULARY BUILDER EXERCISES P. 25-26, EXERCISE 7 - 10.

CONTINUE WITH CONJUNCTION EXERCISES ON P. 141 IN ELLIOT.

REVIEW LOGIC SEQUENCE FROM ABE COMMUNICATIONS

FOLLOW-UP:

UNIT NUMBER: FIVE

LESSON NUMBER: TWO

LESSON OBJECTIVE: APPLY NOTE TAKING AND COMPREHENSIVE READING SKILLS TO TECHNICAL JARGON IN CONTEXT

MATERIALS NEEDED: AS IN ABOVE

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRACTICE MARSH P. 27 - 28

VOCABULARY BUILDER ALSO FOUND IN LEARNING GUIDE G AND CAN SUPPLEMENT MARSH MATERIALS.

FOLLOW-UP: ASSIGN SHOPTALK P. 22

UNIT NUMBER: FIVE

LESSON NUMBER: THREE

LESSON OBJECTIVE: APPLY NOTE TAKING AND COMPREHENSIVE READING SKILLS TO TECHNICAL JARGON IN CONTEXT

MATERIALS NEEDED: AS IN ABOVE

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: COPY MARSH P. 27 AND REVIEW THE PARTS OF A MANUAL.

HAVE STUDENTS REVIEW SEVERAL MANUALS AND USING INDEX OR TABLE OF CONTENTS, FIND INFORMATION OF VARIOUS ITEMS. HAVE THEM RECORD THE TECHNICAL INFORMATION IN THEIR NOTEBOOKS.

FOLLOW-UP:

UNIT NUMBER: FIVE

LESSON NUMBER: FOUR

LESSON OBJECTIVE: AS IN ABOVE

MATERIALS NEEDED: LEARNING GUIDE I, BOOK OF LISTS - CAPITALIZATION

VOCABULARY: AS IDENTIFIED IN LEARNING GUIDE I

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT AND SUMMARIZE LEARNING GUIDE I - ERECT LADDERS AND SCAFFOLDS. TASK 1: DESCRIBE PORTABLE LADDERS (P. 3- 9).

HANDOUT GUIDELINES FOR CAPITALIZATION FROM BOOK OF LISTS P. 209. DISCUSS THE PROPER USE OF CAPITALIZATION IN SENTENCES.

FOLLOW-UP: ASSIGN CAPITALIZATION HOMEWORK - ELLIOT

UNIT NUMBER: FIVE

LESSON NUMBER: FIVE

LESSON OBJECTIVE: AS IN ABOVE

MATERIALS NEEDED: LEARNING GUIDE I, BOOK OF LISTS, ELLIOT

VOCABULARY: AS IDENTIFIED IN LEARNING GUIDE I

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT AND SUMMARIZE LEARNING GUIDE I: DESCRIBE PORTABLE LADDERS - SELF TEST.

HAVE STUDENTS MAKE UP POSTERS SHOWING LADDER SAFETY.

DISCUSS PROPER PUNCTUATION. HANDOUT AND GO OVER BOOK OF LISTS - P. 207 - 208.

FOLLOW-UP: ASSIGN PUNCTUATION WORKSHEET FROM ELLIOT.

UNIT NUMBER: SIX

LESSON NUMBER: ONE

LESSON OBJECTIVE: UNDERSTANDING AND EXPLAINING TECHNICAL INFORMATION AND DRAWINGS

MATERIALS NEEDED: MARSH

VOCABULARY: AS IDENTIFIED IN MARSH

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES ON EXPLAINING TECHNICAL INFORMATION WITH DRAWINGS. HAVE STUDENTS DO EXERCISES ON P. 29 - 30.

HAVE STUDENTS IDENTIFY WHERE DRAWINGS WOULD MAKE THE SUBJECT MATTER EASIER TO UNDERSTAND.

FOLLOW-UP: ASSIGN SHOPTALK P. 63

UNIT NUMBER: SIX

LESSON NUMBER: TWO

LESSON OBJECTIVE: UNDERSTANDING AND EXPLAINING TECHNICAL INFORMATION AND DRAWINGS

MATERIALS NEEDED: MARSH, LEARNING GUIDE D

VOCABULARY: AS IDENTIFIED IN MARSH AND LEARNING GUIDE D

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES ON EXPLAINING TECHNICAL INFORMATION WITH DRAWINGS. HAVE STUDENTS DO EXERCISES ON P. 31 - 32.

PRESENT AND SUMMARIZE LEARNING GUIDE D: SKETCH AND READ

DRAWINGS. TASK 1: IDENTIFY THE ALPHABET OF LINES

FOLLOW-UP: ASSIGN SHOPTALK P. 69 - 70

UNIT NUMBER: SIX

LESSON NUMBER: THREE

LESSON OBJECTIVE: UNDERSTANDING AND EXPLAINING TECHNICAL INFORMATION AND DRAWINGS

MATERIALS NEEDED: MARSH, LEARNING GUIDE D

VOCABULARY: AS IDENTIFIED IN MARSH AND LEARNING GUIDE D

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES ON EXPLAINING TECHNICAL INFORMATION WITH DRAWINGS. HAVE STUDENTS DO EXERCISES ON P. 33 - 34.

CONTINUE WITH LEARNING GUIDE D: SKETCH AND READ DRAWINGS FROM LAST DAY. TASK 1: IDENTIFY THE ALPHABET OF LINES

FOLLOW-UP: ASSIGN SHOPTALK P. 56 - 58

UNIT NUMBER: SIX

LESSON NUMBER: FOUR

LESSON OBJECTIVE: UNDERSTANDING AND EXPLAINING TECHNICAL INFORMATION AND DRAWINGS

MATERIALS NEEDED: MARSH, LEARNING GUIDE D

VOCABULARY: AS IDENTIFIED IN MARSH AND LEARNING GUIDE D

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES ON EXPLAINING TECHNICAL INFORMATION WITH DRAWINGS. HAVE STUDENTS DO EXERCISES ON P. 35 - 36.

PRESENT AND SUMMARIZE LEARNING GUIDE D: SKETCH AND READ DRAWINGS. TASK 2: DESCRIBE THE PRINCIPLES OF ORTHOGRAPHIC PROJECTION

FOLLOW-UP: ASSIGN SHOPTALK P. 71 - 72

UNIT NUMBER: SIX

LESSON NUMBER: FIVE

LESSON OBJECTIVE: UNDERSTANDING AND EXPLAINING TECHNICAL INFORMATION AND DRAWINGS

MATERIALS NEEDED: MARSH, LEARNING GUIDE D

VOCABULARY: AS IDENTIFIED IN LEARNING GUIDE D

MOTIVATION: NOT NECESSARY

INSTRUCTION: CONTINUE WITH MARSH EXERCISES P. 37 - 38 ON UNDERSTANDING TECHNICAL INFORMATION WITH DRAWINGS.

CONTINUE WITH LEARNING GUIDE D: SKETCH AND READ DRAWINGS. TASK 2: DESCRIBE THE PRINCIPLES OF ORTHOGRAPHIC PROJECTION.

HAVE THE STUDENTS DRAW AN ORTHOGRAPHIC SKETCH OF THE DESK, TABLE, OR SHELF USING THE TECHNIQUES PRESENTED IN THE LESSON.

FOLLOW-UP:

UNIT NUMBER: SIX

LESSON NUMBER: SIX

LESSON OBJECTIVE: UNDERSTANDING AND EXPLAINING TECHNICAL INFORMATION AND DRAWINGS

MATERIALS NEEDED: LEARNING GUIDE D, ELLIOT

VOCABULARY: AS IDENTIFIED IN LEARNING GUIDE D

MOTIVATION: NOT NECESSARY

INSTRUCTION: COMPLETE LEARNING GUIDE D: SKETCH AND READ DRAWINGS. TASK 2: DESCRIBE THE PRINCIPLES OF ORTHOGRAPHIC PROJECTION.

XEROX AND HANDOUT SECTION ON WORD BLUNDERS IN ELLIOT P. 197 - 208. GO OVER AND DISCUSS COMMON WORD BLUNDERS.

FOLLOW-UP: ASSIGN WORD BLUNDERS EXERCISE AS HOMEWORK

UNIT NUMBER: SEVEN

LESSON NUMBER: ONE

LESSON OBJECTIVE: REMEMBERING TECHNICAL INFORMATION: HOW TO IDENTIFY, ORGANIZE AND RECALL BASIC PROJECT INFORMATION

MATERIALS NEEDED: MARSH, ABE COMMUNICATIONS

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES P. 39 - 41 ON REMEMBERING TECHNICAL INFORMATION.

DO A REVIEW OF ORDERING AND LOGICAL SEQUENCE AS FOUND IN MARSH AND ABE COMMUNICATIONS.

FOLLOW-UP:

UNIT NUMBER: SEVEN

LESSON NUMBER: TWO

LESSON OBJECTIVE: REMEMBERING TECHNICAL INFORMATION: HOW TO IDENTIFY, ORGANIZE AND RECALL BASIC PROJECT INFORMATION

MATERIALS NEEDED: MARSH, NOTEMAKING BY DIANE BROWN

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES P. 42 - 44 ON REMEMBERING TECHNICAL INFORMATION.

DO A REVIEW OF HOW TO STUDY AS PRESENTED IN NOTEMAKING BY DIANE BROWN.

FOLLOW-UP:

UNIT NUMBER: SEVEN

LESSON NUMBER: THREE

LESSON OBJECTIVE: REMEMBERING TECHNICAL INFORMATION: HOW TO IDENTIFY, ORGANIZE AND RECALL BASIC PROJECT INFORMATION

MATERIALS NEEDED: MARSH

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES P. 45 - 47 ON REMEMBERING TECHNICAL INFORMATION.

BEGIN REVIEW OF MEASUREMENT. HAVE STUDENTS MEASURE VARIOUS OBJECT USING THE IMPERIAL AND METRIC SYSTEM. GO OVER PERIMETER AND AREA CALCULATIONS.

FOLLOW-UP:

UNIT NUMBER: EIGHT

LESSON NUMBER: ONE

LESSON OBJECTIVE: LOGICAL THINKING: LEARNING TO ASSOCIATE RELEVANT INFORMATION

MATERIALS NEEDED: MARSH

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES P. 48 - 51 ON LOGICAL THINKING

CONTINUE WITH REVIEW OF MEASUREMENT.

FOLLOW-UP:

UNIT NUMBER: EIGHT

LESSON NUMBER: TWO

LESSON OBJECTIVE: LOGICAL THINKING: LEARNING TO ASSOCIATE RELEVANT INFORMATION

MATERIALS NEEDED: MARSH

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES P. 52 - 54 ON LOGICAL THINKING. THIS CAN BE USED AS PRACTICE FOR THE LOGIC SECTION OF THE TRADES EXAM.

BEGIN REVIEWING BASIC MATH - FRACTIONS. HAVE STUDENTS DO WORD PROBLEMS.

FOLLOW-UP:

UNIT NUMBER: NINE

LESSON NUMBER: ONE

LESSON OBJECTIVE: MAKING THE CORRECT DECISION: ORGANIZING INFORMATION TO MAKE A DECISION

MATERIALS NEEDED: MARSH, ABE COMMUNICATIONS

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES P. 55 - 57 ON MAKING THE CORRECT DECISION.

REVIEW THE 5 W'S AND H IN ABE COMMUNICATIONS.

FOLLOW-UP:

UNIT NUMBER: NINE

LESSON NUMBER: TWO

LESSON OBJECTIVE: MAKING THE CORRECT DECISION: ORGANIZING INFORMATION TO MAKE A DECISION

MATERIALS NEEDED: MARSH, BLACK AND DECKER PLAN BOOK, POPULAR SCIENCE

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: CONTINUE WITH MARSH EXERCISES P. 58 - 61 ON MAKING THE CORRECT DECISION.

PRESENT STUDENTS WITH A BLACK AND DECKER PLAN BOOK SHOWING PROJECT MATERIALS LISTS OR A POPULAR SCIENCE MAGAZINE. HAVE STUDENTS IDENTIFY WHAT DECISIONS MUST BE MADE IN BEGINNING A PROJECT - MATERIALS, TOOLS, ETC.

FOLLOW-UP:

UNIT NUMBER: TEN

LESSON NUMBER: ONE

LESSON OBJECTIVE: READING AND UNDERSTANDING DRAWINGS

MATERIALS NEEDED: MARSH, SHARON TROKE'S MATERIAL AND DIAGRAMS FOR HOMESTUDY AND MEASUREMENT

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES P. 62 - 65 ON UNDERSTANDING DRAWINGS.

AS A REVIEW OF TECHNICAL INFORMATION WITH DRAWINGS, HAVE THE STUDENTS DO VARIOUS ORTHOGRAPHIC DRAWINGS FROM SHARON TROKE'S HOMESTUDY PACKAGE.

STUDENTS SHOULD BEGIN REVIEWING, ON THEIR OWN TIME, ALL MATERIAL FOR THE TRADES EXAM.

FOLLOW-UP:

UNIT NUMBER: TEN

LESSON NUMBER: TWO

LESSON OBJECTIVE: READING AND UNDERSTANDING DRAWINGS

MATERIALS NEEDED: MARSH, SHARON TROKE'S MATERIAL AND DIAGRAMS FOR HOMESTUDY AND MEASUREMENT
VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES P. 66 - 67 ON UNDERSTANDING DRAWINGS.

CONTINUE WITH REVIEW OF TECHNICAL INFORMATION WITH DRAWINGS, HAVE THE STUDENTS DO VARIOUS ORTHOGRAPHIC DRAWINGS FROM SHARON TROKE'S HOMESTUDY PACKAGE.

FOLLOW-UP:

UNIT NUMBER: ELEVEN

LESSON NUMBER: ONE

LESSON OBJECTIVE: COMMUNICATING YOUR IDEAS: GIVING AND

RECEIVING CLEAR INSTRUCTIONS

MATERIALS NEEDED: MARSH

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES P. 68 - 74 ON COMMUNICATING YOUR IDEAS.

HAVE STUDENTS DO A WRITING EXERCISE WHERE THEY HAVE TO APPLY CONCEPTS PRESENTED IN THE PREVIOUS LESSON.

CONTINUE TO REVIEW TO PREPARE FOR THE TRADES EXAM.

FOLLOW-UP:

UNIT NUMBER: TWELVE

LESSON NUMBER: ONE

LESSON OBJECTIVE: TECHNICAL INFORMATION SHOULD NEVER BE FRIGHTENING OR BORING.

MATERIALS NEEDED: MARSH

VOCABULARY:

MOTIVATION: NOT NECESSARY

INSTRUCTION: PRESENT MARSH EXERCISES FROM UNIT.

CONTINUE TO REVIEW AND PREPARE FOR TRADES EXAM.

FOLLOW-UP:

Quiz # 1 August 26/88 Name:_____

Place the names of the items in A under the correct headings in B:

A caliper rule
steel tape
plumb bob
level
hammer
brad
nail
drawshave
chisel

B Fasteners: _____
_____

Edge Cutting Tool:_____
_____

Hand Tool: _____
_____

Testing Tool: _____
_____

Measuring Tool: _____
_____

If I was hanging wallpaper and I wanted to know if I was putting it on straight, what tool could I use?_____

If I wanted to measure the length of this room, what tool would I use?_____

What tool do surveyors use to measure angles? _____

What type of fastener could I use on a barrel? _____

If I wanted to measure the diameter of a balloon, what would I use?_____

Name three technical drawings that we looked at this week:
_____ _____ _____.

Put the following names in their correct places on the diagram of the circular saw:

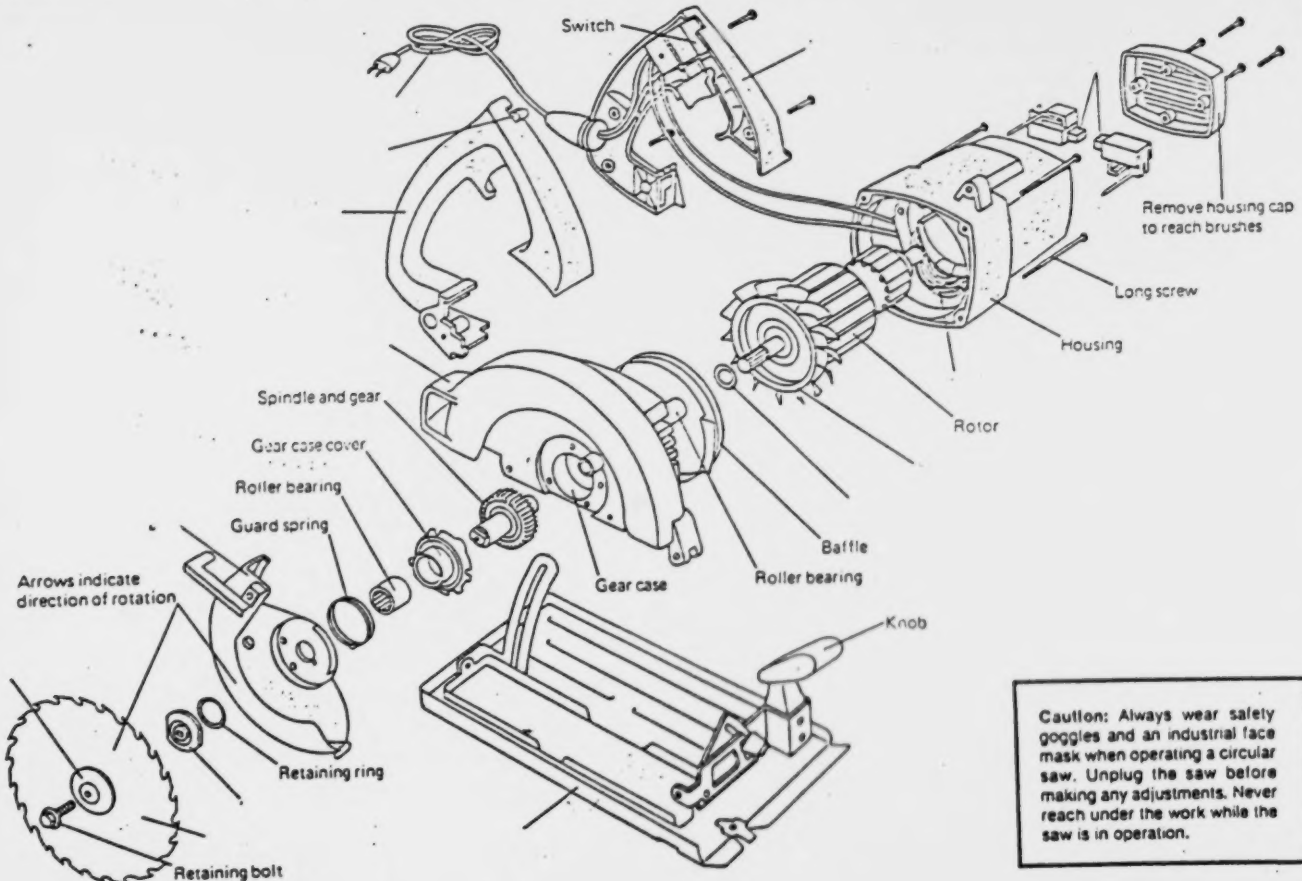
power cord
washer
lock button
motor
blade
fan
handle
stationary blade guard
movable blade guard
shoe
brushes

What type of blade is in the saw? _____

Circular saw

Every 6 to 12 months (or if the motor stops, smokes, or sparks excessively): Inspect the brushes; disassemble the housing and clean out accumulated sawdust with mild soap and warm water; clean the gears and relubricate them with white, stainless grease; and test the switch, motor, and power cord for electrical faults (pp.132–137, 411–412). After each use: Unplug the saw; clean sawdust from its air vents with a small brush; and wipe any oil or grease from the cord to prevent deterioration. Occasionally add a few drops of SAE #20 oil to any oiling holes or lubricating pads.

Always use the right size blade for your saw. The size required is printed on the nameplate of every saw. (Diameters of from 5¼ to 8¼ inches are common.) Position the saw on the work with the blade just clear. Let the motor reach operating speed before bringing the blade into contact with the work. Never force a saw; use light, continuous pressure only to guide it. A dull blade will cause slow cutting and may burn the lumber or overload the motor. Keep extra blades on hand to replace dull ones. Inexpensive blades cost little more than professional sharpening. Gum on the blade will also slow cutting. Remove the blade from the saw to prevent damaging the plastic case and clean it with kerosene or turpentine.



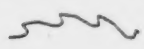
Caution: Always wear safety goggles and an industrial face mask when operating a circular saw. Unplug the saw before making any adjustments. Never reach under the work while the saw is in operation.

Blade replacement

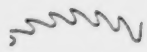
Unplug saw, pull back blade guard, then press saw teeth into a piece of scrap lumber. Open retaining bolt. Place new blade over inner washer and spindle, add outer washer, then hand-tighten bolt. Press saw teeth into lumber for final tightening with wrench.

Types of blades

Always use a blade with the correct tooth design for the material being cut or you may overload the motor. Industrial chrome-plated blades cost the most but stay sharp longer and resist gum buildup and rust.

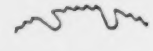


Combination chisel-tooth blade is for general rip and cross cutting where finish or smoothness are not important.



Framing/rip blade gives fast cuts both with and across the grain; gives smooth finish when cutting with the grain.

Crosscut blade gives a smooth finish when cutting across the grain of hard or soft wood. Use to rip-cut very hard woods.



Planer blade gives very smooth cuts both with and across the grain of hard or soft wood. Used for cabinetwork.

Carbide-tipped blade with only eight teeth cuts hardboard and laminates, such as asbestos, Formica, and Masonite.

Plywood blade gives a very smooth cut with a minimum of splintering on plywood. Can also be used for cabinetwork.

Friction action blade is made especially for cutting sheet or corrugated steel, wrought iron, and furnace pipe.

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Circle the word that does not fit.

1 wrench tape pliers truck hammer

2 employer combustion employee personnel interview

3 flame fire persistence blaze combustion

4 reliable saleable negotiable interview flammable

What do these words mean?

extinguish_____

inflammable_____

hazardous_____

reference_____

Measure these lines to the nearest inch.

	Answer
_____	_____
_____	_____
_____	_____
_____	_____

What is the symbol for inches?_____
What is the symbol for feet?_____

Are you tired yet?_____ Hang in there!!!!!

What is the length of a tile?_____
What is the width of a tile?_____
What shape is a tile?_____

Estimate the length of the blackboard_____
Estimate the width of a computer screen_____
Estimate my height_____
Estimate the width of the door_____

what is the difference between a hammer and a mallet?

2 _____

What are wrecking bars used for? _____

7 _____

(6)

2 What are clamps and wood vices used for? _____

_____

Greek roots: Tell what the following roots mean and give an example of each.

ROOT	MEANING	EXAMPLE
(8) gram	letter	diagram
graph	_____	_____
meter	_____	_____
phon	_____	_____
therm	_____	_____

Power Saws

The power saw has a cutting blade made of
a) highspeed steel.
b) reinforced abrasives.

Which protective equipment must be worn when using a cut-off saw?
a) safety glasses.
b) face shield and gloves.

Stationary metal cutting band saws may have downward pressure applied by an adjustable
a) feed screw.
b) counterweight.

Selecting Drill Bits
From the list below, place the correct name on the bits illustrated on the next page.

reinforced bit
twist drill bit
wood bit
spade bit
single-spur bit
multi-spur bit
deep-hole bit
auger bit
brace bit
countersink bit
carbide-tipped bit
hole saw

Name three parts of an atom. Give the charge each has and tell where each is located.

1)_____

_____

2)_____

_____

3)_____

_____

What is an atom?_____

_____

What is the atomic number of and what does it tell about an element?_____

_____

_____

QUIZ #2 September 09/88 Name_____

Tell what the following words mean when describing parts of an airplane.

1. rudder _____

(6) 2. canopy _____

3. strut _____

Place a "T" next to the technical titles in this list.

(3)
T The Reader's Digest Vehicle Book
T Blue prints and Diagrams
___ Farmer Brown's Stories
T Complete Book of Home Repair
___ To Catch a Spy

Which occupations are not highly technical?

(6)

___Doctor	✓Garbageman	___Nurse
___Plumber	___Auto Mechanic	✓Truck Driver
___Electrician	✓Homemaker	___Writer
___Engineer	✓Cashier	✓Dishwasher
✓Babysitter	___Judge	___Apprentice

What is a noun? person, place or thing

(3) What is a verb? action word

What is an adjective? describing word

Give examples of the following:

noun	verb	adjective
1.		
2.		
3.		
4.		
5.		

(15)

Write sentences using each of the following words:

2 appearance _____

_____

2 applicant _____

_____

2 benefits _____

_____

2 discrimination _____

_____

2 experience _____

_____

2 persistence _____

_____

2 reference _____

_____

2 opportunity _____

_____

2 caution _____

_____

2 dangerous _____

_____

Place the correct name under each of the tools on the following pages:

long steel tape	scriber	pocket tape
folding rule	chalkline	crosscut saw
framing square	plane	keyhole saw
combination square	plumb bob	coping saw
bevel edge chisel	compass saw	spirit level
straight edge chisel	try square	butt edge chisel

What are some of the units used to measure length in the Imperial System?

_____ _____

_____ _____

How many inches are in a foot?_____
How many feet are in a yard?_____
How many inches are in a yard?_____
Which is longer a yard or a foot?_____

Give a set of instructions for 1 of the following:
A. Starting a Honda on a cold morning
B. Cutting a sheet of plywood in half

_____

_____

_____

_____

_____

_____

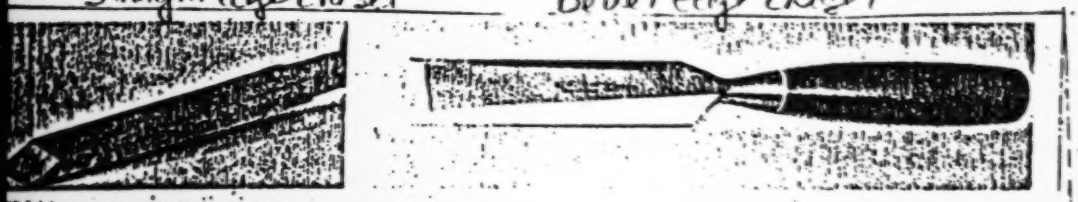
Draw a technical diagram of a coffeemaker. Be sure to identify all the parts.

You are finished!!

chalk line

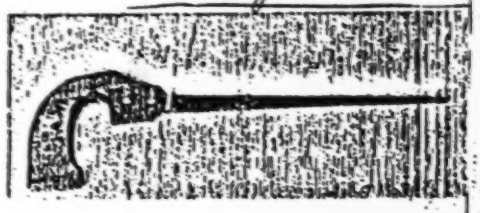
straight edge chisel

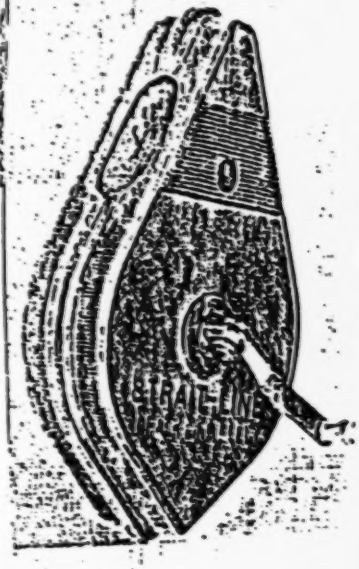
bevel edge chisel



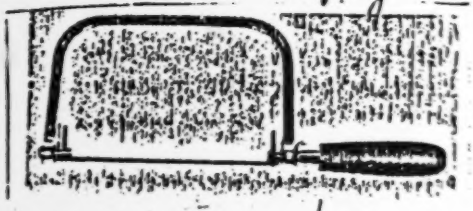
compass

keyhole

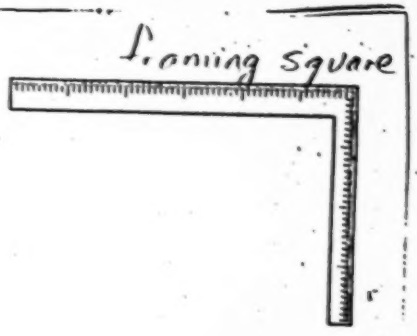




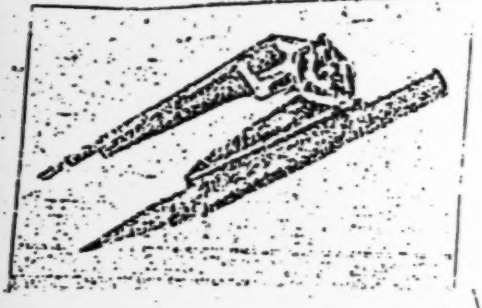
coping



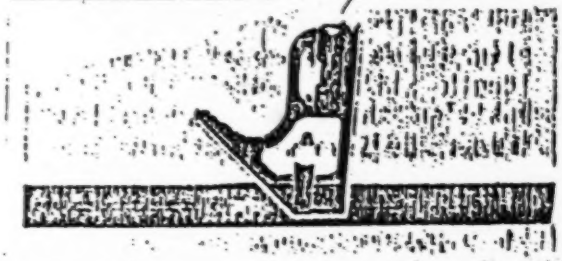
framing square



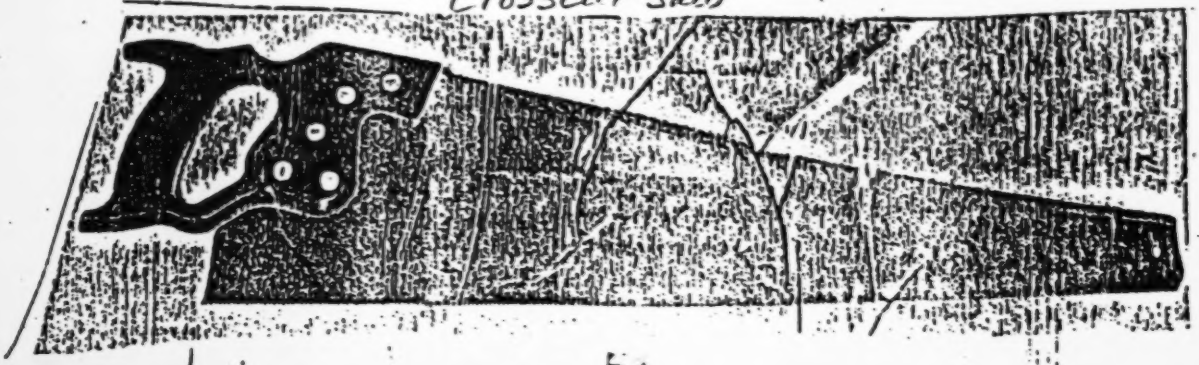
scriber



combination square



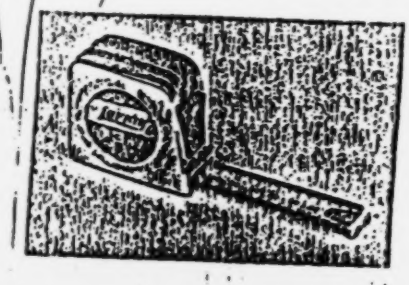
crosscut saw



Butt chisel

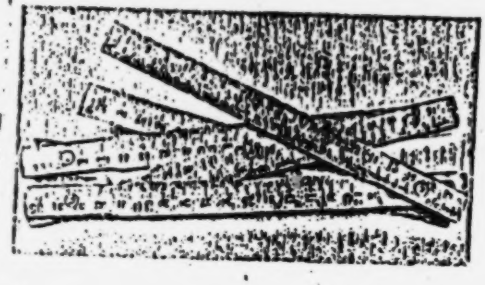
plane

pocket tape

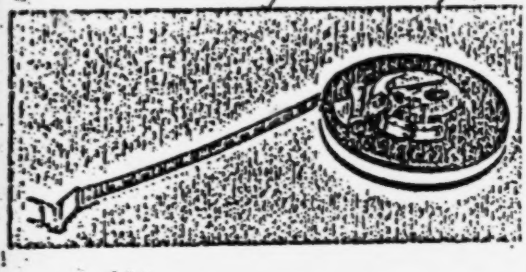


plumb bob

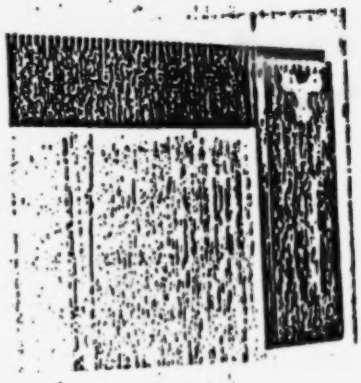
Folding rule



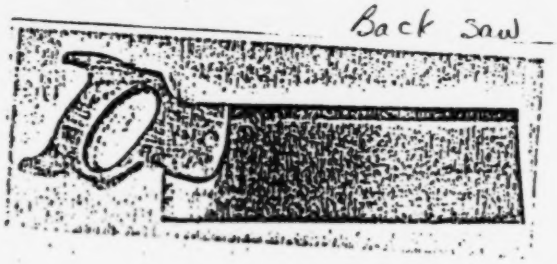
long steel tape



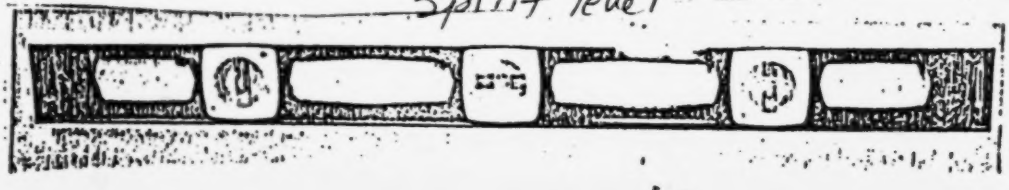
try square



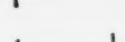
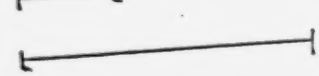
Back saw



spirit level



1. With a ruler measure each of the following lines to the nearest inch.

	Estimate	Actual
a)	____	2
b)	____	2
c)	____	2
d)	____	3
e) 	____	1
f) 	____	2

(6)

2. Measure each of the above lines to the nearest fourth of an inch.

a) Estimate = _____ Actual = 1 2/4 = 6/4

b) Estimate = _____ Actual = 2 = 8/4

c) Estimate = _____ Actual = 1 3/4 = 7/4

d) Estimate = _____ Actual = 2 2/4 = 10/4

e) Estimate = _____ Actual = 2/4

f) Estimate = _____ Actual = 1 3/4 = 7/4 or 1 2/4 = 6/4

(6)

3. Measure each of the above lines to the nearest eighth of an inch.

a) Estimate = _____ Actual = 1 4/8 = 12/8

b) Estimate = _____ Actual = 2 = 16/8

c) Estimate = _____ Actual = 1 6/8 = 14/8

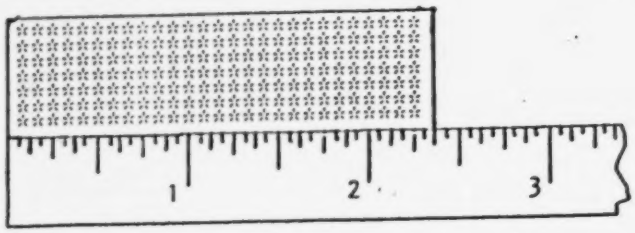
d) Estimate = _____ Actual = 2 4/8 = 20/8 or 2 5/8 = 21/8

e) Estimate = _____ Actual = 4/8

f) Estimate = _____ Actual = 1 5/8 = 13/8

(6)

4. A ruler is placed against a metal plate as shown in the diagram. What is the length of the plate?



5. Draw a line $1\frac{1}{2}$ in. long. Mark it off in eights of an inch.

6. Draw lines of the following lengths;

a) $2\frac{1}{8}$ in.

b) $3\frac{3}{8}$ in.

c) $4\frac{3}{4}$ in.

d) $6\frac{1}{2}$ in.

e) $5\frac{5}{8}$ in.

f) $\frac{3}{4}$ in.

g) $4\frac{7}{8}$ in.

h) $2\frac{3}{4}$ in.

(10)

Apprentice Preparation Program

QUIZ #3 September 23, 1988 Name:_____

1. Reorder these words to create a proper sentence.

   a) a result can injury. Carelessness serious in

   _____

   b) an Arctic He College student. became

   _____

   c) be The blocked, never exit must emergency

   _____

   d) by get can You persistent. being ahead

   _____

2. The wrench used to tighten the drill chuck to the drill bit is a
   a) allen key.
   b) chuck key.

   You must not lock the drill switch in the ON position if there is risk of
   a) power failure.
   b) jamming.

   Driving and removing screws can be done with a drill that has
   a) variable speed.
   b) trigger switch.

   You should not reverse the direction of rotation of a drill motor until
   a) the motor has stopped turning.
   b) the drill is unplugged.

3. What is a noun?_____

   What is a verb?_____

   What is an adjective?_____

   What is a preposition?_____

   What is a conjunction?_____

4. List 5 words for each of the following:

Noun	Verb	Adjective

Preposition	Conjunction

5. Given the following sentences
   - underline the subject (noun) once
   - circle the verb
   - underline the adjective twice

   a) Saw arbors are standardized.

   b) You can't run a good shop without inventory.

   c) Good quality work is important.

   d) Mechanical devices sometimes need repair.

   e) The circular saw was broken.

   f) John bought the old drill and sander.

   g) This class improves daily.

Correct these speech duds.

1. (Try and, Try to) read a controversial article about conservation before the next class.
2. What (kind of, kind of a) book shall I read?
3. He (doesn't, don't) know anything about energy problems.
4. (Inside the, Inside of the) room are many books for review.
5. (Anyway, Anyways), I received a book on energy conservation as a gift.
6. My brother and his friend (wisht, wished) they had the book.
7. They (might have, might of) seen it in the store.
8. We (seldom, seldom ever) see them replant the trees.
9. Mr. Gupta told us we (ought not, hadn't ought) to have missed talking with the forest ranger.
10. He (brought, brung) many tree samples with him.
11. My sister (can hardly, can't hardly) wait to visit the northern woods.
12. (Ain't, Aren't) you glad to learn about the forest's enemies?
13. What (sort of, sort of a) chart did the forest ranger show?
14. (Were you, Was you) aware of the use of fire in forest management?
15. They (should have, should of) learned about reforestation.
16. Environment is (different from, different than) energy.
17. Don't (feel bad, feel badly) about not knowing the difference.
18. (This, This here) reference book on energy is enlightening.
19. The closest mountain to us is a (long way, long ways).
20. On the trail hike, I was (thrown, throwd) off the mule.
21. The ranger's pictures were (inside the, inside of the) wooden hut.
22. (Back of, In back of) the hut he keeps his tools.
23. Are (them, those) guns ever used?
24. He (says, sez) conservation is for the birds, animals, and people.
25. Mrs. McAdoo (was scarcely, wasn't scarcely) aware of the project.

If your score was 19 or less, review pages 209-210 before continuing.

Care and maintenance of hand tools.

Choose the best answer for the following questions.

1. When metal tools have been exposed to moisture they should be

   a. heavily oiled
   b. dried and lightly oiled
   c. placed in the sun as soon as possible
   d. coated with silicone

2. To protect the cutting edges of hand planes you should

   a. retract the blade after each use
   b. remove the blade during storage
   c. store the plane on its side
   d. store the plane upright on a flat, smooth and clean surface

3. The wooden handle on a handsaw should be tightened

   a. daily
   b. before being used
   c. after each use
   d. at the first sign of looseness

4. Tape measures should be lubricated with

   a. silicone or wax
   b. light oil
   c. white grease
   d. vaseline

1. Mr. Sullivan wishes to have his yard sodded. The yard is 16 ft by 14 ft. How many square feet of sod does he need? If sod cost $5.64 a square foot, what will it cost him?

2. Mr. Champney's garden is shaped like a rectangle. The rectangle is 40 feet long and 20 feet wide. What is the area of his garden?

3. How many square feet are in the floor area of a room which is 16 feet by 12 feet?

4. Estelle had the living room carpet cleaned. The carpet cleaner charged 40¢ per square yard. The rug measured 9 yards by 11 yards. What did the cleaning cost?

5. George needs 74 inches of pipe for a plumbing job; pipe costs 12¢ per inch. How much will it cost to buy the pipe?

2

6. Harold needs 72 inches of frame to trim a window.

a) Trim costs $.15 per inch. How much will it cost him to buy trim?

2

b) At another store trim cost $1.65 for 12 inches. How much would it cost him to buy the trim at this store?

2

7. Sheila bought 36 $\frac{1}{2}$ inches of cottom fabric and 42 $\frac{1}{2}$ inches of polyester fabric and 72 inches of nylon netting. How much fabric did Sheila buy altogether?

2

8. Mr. Gelzer built a bookshelf using three boards. One board was 27" long the second was 36" long and the third 76". What was the total length of board needed for the bookcase?

2

9. Mr. Champney's garden is shaped like a rectangle. The rectangle is 26 feet long and 15 feet wide. What is the perimeter of his garden?

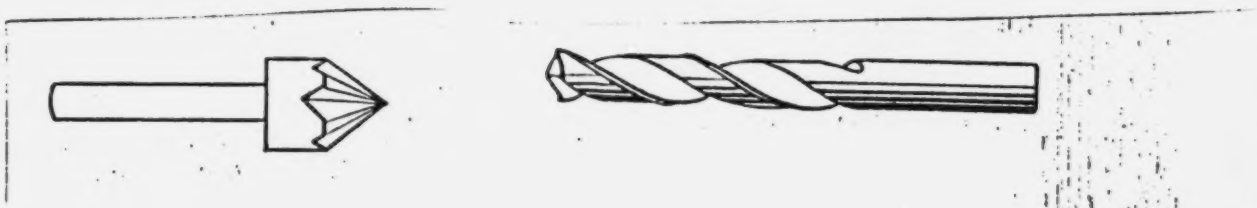
10. A rectangle desk top is 148 in long and 52 in wide.

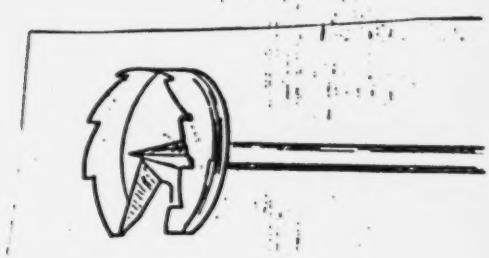
a) What length of plastic moulding is needed to go around the outer edge of the desk?

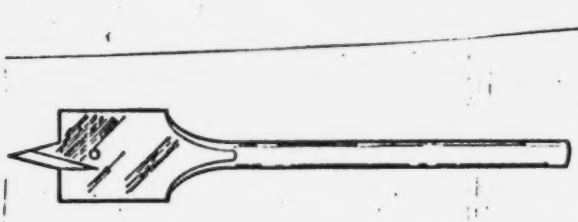
b) If moulding costs $2.16 a in., how much will the moulding cost?

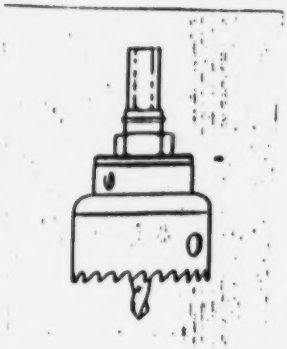
11. A flower garden is shaped like a triangle. One side is 8 ft the second is 452 ft and the third is 563 ft. Find the perimeter of the flower garden.

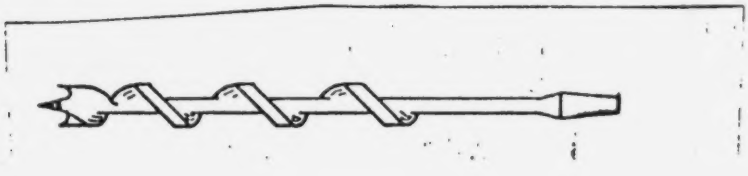
Write a paragraph describing what you did on the job site this week. Keep in mind good sentence structure (noun, verb, adjective), punctuation, (. ? ,).
1/2 page minimum.











Apprentice Preparation Program

QUIZ #4 October 07, 1988 Name:_____

1. Reorder these words to create a proper sentence.

   a) know antonym You for already exterior. the

   _____

   b) the already to trade Has system? converted your metric

   _____

   c) slippery be can or floor A dangerous. cluttered

   _____

   d) equipment. all is Preventive for important maintenance

   _____

   e) on Good the quiz! luck

   _____

2. What is a noun?_____

   What is a verb?_____

   What is an adjective?_____

3. List 5 words for each of the following:

Noun	Verb	Adjective
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

4. Fill in all the necessary punctuation and capitalization in the following sentences. Indicate capital letters by circling the small letter that should be capitalized. Use . , " " ' ! ?

a) i often sleep late on weekends

b) three of the keewatins largest towns are rankin inlet baker lake and eskimo point

c) is yellowknife the largest city in the northwest territories

d) power tools are dangerous if not used properly

e) mr d owbik the mayor of eskimo point works for the hamlet.

f) leo inquired where is the hand saw

g) the tide detergent is in the closet

h) dannys books are in the classroom

i) i heard thomas liked hells bells

j) eric asked may i have some more homework

k) the study period is from 8 00 a m to 8 30 a m

l) there are four students in the morning class david thomas eric and donald

m) this course will be complete on october 21 1988

n) sim leo danny and george are very smart

o) where did he go during the coffee break

p) no you may not go for a cigarette

q) donald would you like to go to the store

r) david read the book george saw the movie thomas did both

s) wow that sure was an good quiz

t) yes leo you may do the experiment

u) when are we going to have science asked eric

5. Word Blunders

Complete each of the following sentences by writing in the blank the correct form of the word in parentheses.

	Answers
1. (Their, There) have been only three important diamond fields found.	1. _____
2. (Between, Among) the three diamond fields, the largest yield comes from Africa.	2. _____
3. (Besides, Beside) Africa and India, which is the other one?	3. _____
4. (Almost, Most) everyone knows it is Brazil.	4. _____
5. Miners often work (in, into) the earth and rocks.	5. _____
6. How do they feel (than, then) after a long day mining the diamonds?	6. _____
7. (To, Tob, Two) of the important factors looked for in gem minerals are color and hardness.	7. _____
8. Can you list other precious gems (beside, besides) diamonds?	8. _____
9. The Hope Diamond is a (real, very) valuable one.	9. _____
10. (Its, It's) now the property of the Smithsonian Institution located in Washington, D.C.	10. _____
11. Mr. Henry Birks (sure, surely) knew the gem market.	11. _____
12. They polish the Kohinoor diamond (good, well).	12. _____
13. (Whose, Who's) the owner of the Kohinoor Diamond?	13. _____
14. That diamond exhibit was (good, well).	14. _____
15. Her ruby looks (like, as) mine.	15. _____
16. Place your tickets for the prize pearl (in, Into) the barrel at the exit door.	16. _____
17. The ticket price (than, then) was only one dollar.	17. _____
18. The loss of the sapphire bracelet was a (very, real) expensive one.	18. _____
19. Jade is (different from, different than) a ruby or a topaz.	19. _____
20. A sapphire is not (so, as) expensive as a ruby.	20. _____
21. The Star of Africa is (as, so) well known as the Kohinoor.	21. _____
22. It is (to, too, two) expensive for me to buy.	22. _____
23. Imitation gems are cheaper (than, then) the real thing.	23. _____
24. An expert can tell a sapphire by (its, it's) blue color.	24. _____
25. I saw many priceless jewels (their, there).	25. _____

6. Write sentences using these words.

a) conversion _____

_____

b) estimate _____

_____

c) manual _____

_____

d) gauge _____

_____

7. Preventive Maintenance

Give 5 reasons for preventative maintenance.

1) _____

2) _____

3) _____

4) _____

5) _____

Give 5 things which should be on a preventative maintenance schedule.

1) _____

2) _____

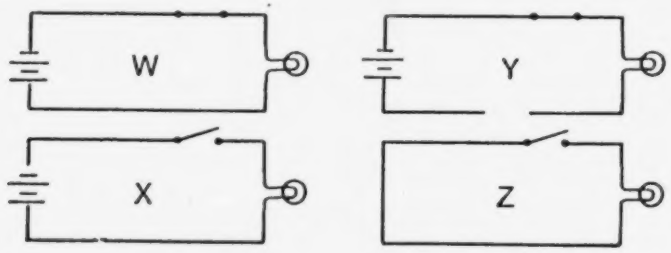
3) _____

4) _____

5) _____

8. Understanding and Explaining Technical Information with Drawings

Using the four diagrams of electrical circuits, answer the questions by underlining the best answers.



a) In which diagram(s) would you find the light bulb to be lit?

1) W 2) X 3) Y 4) Z

b) One of the circuits will work if you close the switch. Which one?

1) W 2) X 3) Y 4) Z

c) If the switch in diagram Z is closed, the light bulb will still not be lit. Why not?

a) The bulb is burned out.
b) There is no source of electricity.
c) The batteries are dead.
d) The wire is broken.

9. Ladders

Choose the best answer for the following.

1. To protect wooden ladders from the weather, you may only use
   a) solid color stain
   b) latex paint
   c) a clear finish

2. A ladder that is normally used indoors is a
   a) single ladder
   b) stepladder ladder
   c) extension ladder

3. Rung spacing on ladders must be
   a) 7" centers
   b) 12" centers
   c) 15" centers

4. A portable ladder must project _____ above the level of the upper landing to which it provides access.
   a) 305 mm (1' - 0")
   b) 762 mm (2' - 6")
   c) 914 mm (3' - 0")

5. No worker shall work from the top _____ rung(s) or steps of a ladder.
   a) 1
   b) 2
   c) 3

6. Single or extension ladders must be leaned so that the horizontal distance they cover is _____ the length of the ladder between supports.
   a) 1/4
   b) 1/3
   c) 1/2

10. Ladder Safety

Answer TRUE or FALSE to the following statements

a) The lower end of the ladder shall not rest on a firm and level base. _____

b) The ladder shall be of sufficient length to project at least 0.91 m (3') above the level of the landing to which it provides access. _____

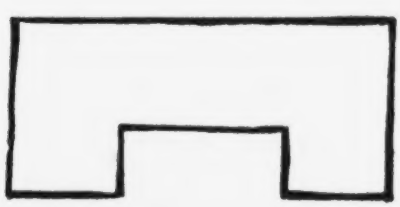
c) Never face the ladder when climbing up or down._____

d) Do not carry heavy or bulky objects when going up or down ladders._____

e) Always reach more than one arm's length beyond the side of the ladder. _____

11. Identify each of the lines below by stating:
   a) its name
   b) its thickness
   c) its main use

1)



a)_____

b)_____

c)_____

2) a) _____

b) _____

c) _____

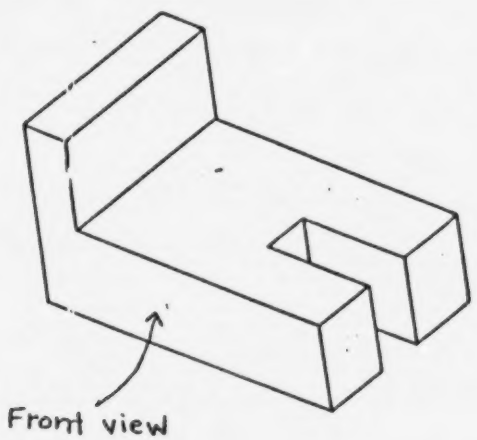
3) a) _____

b) _____

c) _____

12. On the paper provided, draw a sketch of the desk. Use the proper lines (visible, extension, hidden lines). Put on a title, drawing number, date and the drawer's name.
The dimensions of the desk are: length - 52 cm
width - 26 cm

13. Using the sketching techniques learned in class, produce orthographic sketches of the figure shown below. Sketch each view (front, rear, right side, left side, and bottom) on the paper provided.



14. Write a paragraph describing what you did on the job site this week. Keep in mind good sentence structure (noun, verb, adjective), punctuation, (. ? , " " ! '). Try to use some of the new technical words that you have learned:

calculator	conversion	diagnose
estimate	exterior	interior
gauge	index	invoice
manual	retail	

1/2 page minimum.

DRAWING BY:	TITLE:	DRAWING NUMBER:
DATE:		

SCIENCE COURSE SUMMARY

UNIT 1: MATTER	**11.50 Hours**
The Nature of Matter	1.25
Solids	2.50
Liquids	2.50
Gases	2.50
Tour	1.25
Review and Test	2.50
UNIT 2: FLUIDS	**13.75 Hours**
Fluid Pressure	2.50
Density and Specific Gravity	2.50
Buoyancy and Archimedes' Principle	2.50
Hydraulics	2.50
Tour	1.25
Review and Test	2.50
UNIT 3: SIMPLE MACHINES	**17.50 Hours**
Work, Power, Horsepower, Friction	2.50
Inclined Planes	2.50
Levers	3.75
Pulley Systems	2.50
Gears and Belt Drive Systems	2.50
Tour	1.25
Review and Test	2.50
UNIT 4: HEAT AND TEMPERATURE	**11.25 Hours**
Effects of Heat	1.25
Transmission of Heat	1.25
Temperature	1.25
Measurement of Heat	1.25
Boiling	1.25
Evapouration and Condensation	1.25
Tour	1.25
Review and Test	2.50
GENERAL REVIEW	**4.75 Hours**
TOTAL SUBJECT TIME:	**58.75 Hours**

B1

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 1 THE NATURE OF MATTER - PROPERTIES

OBJECTIVE: EXPLAIN THAT MATTER IS COMPOSED OF ATOMS AND MOLECULES, ILLUSTRATE ENERGY, IDENTIFY THE STATES OF MATTER, RECOGNIZE THAT ENERGY MAY BE TRANSFORMED, EXPLAIN THE KINETIC MOLECULAR THEORY, DEFINE MASS

FOCUS: INTRODUCTION OF BASIC DEFINITIONS AND PROPERTIES OF MATTER

MATERIALS: THE NATURE OF MATTER UNIT PAK PP 1-19A, VIDEO TAPE #1 SECTION 1, MOLECULAR MODEL SET, PENDULUM, ICE, HEAT SOURCE, SPRING (JOKE PEANUT CONTAINER), PULLEY AND WEIGHTS, FAN, LAMP, BALANCE

METHOD: FOLLOW UNIT PAK, HANDOUTS PP 1-6 OF STUDENT WORKBOOK, DEMONSTRATIONS

VOCABULARY: MATTER, ATOMS, MOLECULES, ELEMENT, COMPOUND, WORK, ENERGY, KINETIC ENERGY, POTENTIAL ENERGY, MASS, WEIGHT, SOLID, LIQUID, GAS

NOTES

EXPLAIN THE DEFINITIONS OF MATTER, ATOMS, AND MOLECULES. DEMONSTRATE USING THE MOLECULAR MODEL. USE THE PERIODIC TABLE TO EXPLAIN THE ELEMENTS.

DEFINE FORCE, WORK, ENERGY, KINETIC ENERGY, POTENTIAL ENERGY AND DEMONSTRATE USING THE PENDULUM AND THE PULLEY. ILLUSTRATE BY GIVING OUT THE JOKE PEANUT CONTAINER AND HAVING THE SPRINGS JUMP OUT.

USE THE MOLECULAR MODEL TO SHOW THE DIFFERENT STATES OF MATTER, DISCUSS THE PROPERTIES OF EACH. DEMONSTRATE THE CHANGES OF STATE BY MELTING ICE TO WATER TO VAPOUR.

DISCUSS THE TRANSFORMATION OF ENERGY BY FIRST DEFINING THE TYPES OF ENERGY (CHEMICAL, MECHANICAL, ELECTRICAL, RADIANT, NUCLEAR, THERMAL), GIVING EXAMPLES OF EACH, THEN DISCUSSING HOW THIS TAKES PLACE IN A SNOWMOBILE.

DISCUSS THE KINETIC MOLECULAR THEORY, USE THE TRANSFORMATION OF ICE TO WATER TO VAPOUR TO DIRECT THE DISCUSSION.

DEFINE MASS AND WEIGHT. USE THE BALANCE TO WEIGH BLOCKS OF THE SAME SIZE BUT DIFFERENT ELEMENTS. DISCUSS HOW WEIGHT CAN CHANGE GIVEN DIFFERENCES IN GRAVITY BUT MASS IS CONSTANT.

SUGGEST THAT THE STUDENT'S VIEW TAPE #1 IN THEIR OWN.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 1 THE NATURE OF MATTER - SOLIDS

OBJECTIVE: EXAMINE THE PROPERTIES OF A SOLID AND CALCULATE THE VOLUME OF REGULAR AND IRREGULAR OBJECTS

FOCUS: VOLUMETRIC MEASUREMENTS, SCIENTIFIC METHOD

MATERIALS: THE NATURE OF MATTER UNIT PAK PP 20-31A. VIDEO TAPE #2 SECTIONS 1-2, VARIOUS BLOCKS, CHART OF CUBIC AND CAPACITY UNITS, RULERS, GRADUATED CYLINDER, OVERFLOW CAN

METHOD: FOLLOW UNIT PAK, HANDOUTS PP 7-11 OF STUDENT WORKBOOK, DEMONSTRATIONS, INVESTIGATION

VOCABULARY: VOLUME, MENISCUS, CUBIC AND CAPACITY MEASURES, CALIPERS

NOTES

REVIEW THE STATES OF MATTER AND THE PROPERTIES OF EACH STATE.

DEFINE VOLUME. INTRODUCE METRIC CUBIC AND CAPACITY UNITS WITH THE ASSISTANCE OF THE CHART. DISCUSS THE PREFIXES IN THE METRIC SYSTEM.

USING RULERS, CALIPERS, AND TAPE, MEASURE THE VOLUME OF A NUMBER OF REGULAR OBJECTS. DISCUSS UNITS OF MEASURE.

SHOW HOW THE VOLUME OF A SMALL IRREGULAR OBJECT CAN BE MEASURED USING A GRADUATED CYLINDER.

INTRODUCE THE SCIENTIFIC METHOD BY HAVING THE STUDENTS COMPLETE INVESTIGATION #1: MEASUREMENT OF AN LARGE IRREGULAR OBJECT.

SUGGEST THAT THE STUDENT'S VIEW TAPE #2 SECTIONS 1 AND 2 IN THEIR OWN TIME.

COMPLETE PAGE 8 FOR HOMEWORK.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 1 THE NATURE OF MATTER - GASES

OBJECTIVE: IDENTIFY THE COMPOSITION OF THE AIR, DEFINE ATMOSPHERIC PRESSURE, EXAMINE THE OPERATION OF AIR PRESSURE READING DEVICES

FOCUS: AIR PRESSURE, STANDARD ATMOSPHERE, BAROMETERS

MATERIALS: THE NATURE OF MATTER UNIT PAK PP 38-49. VIDEO TAPE #2 SECTION 3 TAPE #3 SECTION 1, MOLECULAR MODEL SET, GLASS, RIGID COVER, MANOMETER, FOOD COLORING, ANEROID BAROMETER

METHOD: FOLLOW UNIT PAK, HANDOUTS PP 16-21 OF STUDENT WORKBOOK, DEMONSTRATION

VOCABULARY: ATMOSPHERIC PRESSURE, NEWTONS, KILOPASCALS, STANDARD ATMOSPHERE, BAROMETER, ALTIMETER

NOTES

REVIEW THE STATES OF MATTER AND THE PROPERTIES OF EACH.

HAVE THE STUDENTS CONSTRUCT MODELS OF THE ELEMENTS THAT COMPRISE AIR USING THE MOLECULAR MODEL SET. DESCRIBE THE CHEMICAL COMPOSITION OF AIR WITH AID OF THE PIE CHART (PP 16, STUDENT WORKBOOK).

GIVE SOME EXAMPLES OF AIR PRESSURE. DEMONSTRATE WITH A GLASS OF WATER AND A RIGID COVER. LAYOUT 1 SQ. METRE AND DESCRIBE THE WEIGHT OF AIR PRESSING ON IT. DEFINE NEWTONS, KILOPASCALS.

DEFINE PRESSURE AS FORCE/AREA. USE A METRE STICK TO SIMULATE A MERCURY BAROMETER. DEMONSTRATE WITH A DIAGRAM (PP 18, STUDENT WORKBOOK). FILL THE MANOMETER WITH A COLORED LIQUID. INCREASE THE AIR PRESSURE WITH THE PUMP AND DISCUSS THE RESULTS. USE A WEATHER MAP TO SHOW HOW AIR PRESSURE CHANGES AND DISCUSS THIS WITH AID OF THE DIAGRAM.

DEMONSTRATE THE OPERATION OF THE ANEROID BAROMETER. INCREASE AND DECREASE THE AIR PRESSURE WITH THE AIR PUMP AND DISCUSS THE RESULTS. EXAMINE THE EFFECT OF ALTITUDE ON THE READINGS OF THE BAROMETER. DISCUSS THE OPERATION OF AN ALTIMETER.

DISCUSS THE EFFECT OF TEMPERATURE ON A GAS. ILLUSTRATE BY HAVING THE STUDENTS DESCRIBE WHAT HAPPENS WHEN THEY LEAVE A 5 GAL. GAS CONTAINER OUT IN THE SUN ON A HOT DAY.

HAVE STUDENTS REVIEW GLOSSARY IN PREPARATION FOR TEST.

SUGGEST THAT THE STUDENT'S VIEW TAPE #2 SECTION 3 AND TAPE #3 ON THEIR OWN TIME.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 1 THE NATURE OF MATTER

OBJECTIVE: DEMONSTRATE THE PRACTICAL APPLICATIONS OF THE UNIT'S CONCEPTS BY TOURING THE AIRPORT OBSERVER'S OFFICE.

FOCUS: AIR PRESSURE, STANDARD ATMOSPHERE, BAROMETERS

MATERIALS: MERCURY BAROMETER, ALTIMETER SETTING DEVICE, WEATHER BALLOONS, WET AND DRY BULB THERMOMETERS, TOTAL AVIATION BRIEFING SYSTEM COMPUTER

METHOD: TOUR OF AIRPORT OBSERVER'S OFFICE

VOCABULARY: ATMOSPHERIC PRESSURE, MERCURY BAROMETER, ALTIMETER SETTING, WEATHER MAPS, FORECASTS

NOTES

HAVE OBSERVER TAKE THE STUDENTS THROUGH AN HOURLY REPORTING PROCEDURE.

USE THE TAB SYSTEM TO GENERATE SURFACE ANALYSIS WEATHER MAPS AND DISCUSS THE PRESSURE SYSTEMS. CORRELATE THE SURFACE ANALYSIS WITH FORECASTS FOR THE REGION.

UNIT 2 FLUIDS - FLUID PRESSURE, DENSITY, SPECIFIC GRAVITY

OBJECTIVE: DEFINE PRESSURE, MEASURE PRESSURE IN BRITISH AND SI UNITS, EXPLAIN RELATIONSHIP BETWEEN DEPTH AND PRESSURE, DEFINE DENSITY AND SPECIFIC GRAVITY, MEASURE DENSITY AND SPECIFIC GRAVITY IN BRITISH AND SI UNITS.

FOCUS: FORMULAE FOR PRESSURE, DENSITY, AND SPECIFIC GRAVITY

MATERIALS: FLUIDS UNIT PAK PP 1-19A. VIDEO TAPE #4 SECTIONS 1-4, SPRING BALANCE (CALIBRATED IN NEWTONS), MARRIOT'S BOTTLE, SYRUP, MILK, OIL, BEAKER, ICE, METAL BLOCKS, OVERFLOW CAN, CATCH BUCKET

METHOD: FOLLOW UNIT PAK, HANDOUTS PP 1-3 OF STUDENT WORKBOOK, DEMONSTRATION

VOCABULARY: FLUID PRESSURE, KILOPASCAL, DENSITY, SPECIFIC GRAVITY, HYDROMETER

NOTES

REVIEW FORCE, DEMONSTRATE THE UNITS OF FORCE USING THE CALIBRATED SPRING BALANCE, DEFINE PASCAL, KILOPASCAL

DO SOME EXAMPLES OF CALCULATING PRESSURE GIVEN DIFFERENT UNKNOWNS (PP 6-7 OF UNIT PAK). ASSIGN QUESTIONS ON PP 8 FOR HOMEWORK.

DEMONSTRATE WITH THE USE OF THE MARRIOT'S BOTTLE THE EFFECT OF DEPTH ON FLUID PRESSURE.

USE TO 3 METAL BLOCKS OF EQUAL VOLUME BUT DIFFERENT WEIGHT TO LEAD A DISCUSSION ON DENSITY. DEMONSTRATE THE CONCEPT USING SYRUP, MILK, AND OIL. FLOAT ICE CUBES IN WATER FOR A FURTHER DEMONSTRATION.

CALCULATE DENSITY USING THE EXAMPLES ON PP 15 UNIT PAK. ASSIGN QUESTIONS 1-4 ON PP 16 FOR HOMEWORK.

CALCULATE THE DENSITY OF WATER. DEFINE SPECIFIC GRAVITY. HAND OUT CHART OF SPECIFIC GRAVITIES.

SUGGEST THAT THE STUDENT'S VIEW TAPE #4 SECTIONS 1-4.

UNIT 2 FLUIDS - BUOYANCY, ARCHIMEDES' PRINCIPLE

OBJECTIVE: DEFINE BUOYANT FORCE, EXPLAIN ARCHIMEDES' PRINCIPLE, EXAMINE WHY OBJECTS FLOAT OR SINK

FOCUS: BUOYANCY FORCE, DENSITY, DISPLACEMENT

MATERIALS: FLUIDS UNIT PAK PP 20-33. VIDEO TAPE #4 UNIT 5, TAPE #5 UNIT 1, SPRING BALANCE (CALIBRATED IN NEWTONS), BEAKER, WOODEN BLOCKS, OVERFLOW CAN, CATCH BUCKET, CLAY

METHOD: FOLLOW UNIT PAK, HANDOUTS PP 4-10 OF STUDENT WORKBOOK, DEMONSTRATION, INVESTIGATION

VOCABULARY: BUOYANCY, BUOYANT FORCE, ARCHIMEDES, DISPLACEMENT, FLOTATION

NOTES

REVIEW FORCE, PRESSURE, DENSITY, AND SPECIFIC GRAVITY. REVIEW HOMEWORK ASSIGNMENT.

USING THE SPRING BALANCE, DEMONSTRATE HOW THE WEIGHT OF AN OBJECT APPEARS TO DECREASE WHEN LOWERED IN WATER. DISCUSS WHAT MAY HAVE CAUSED THIS TO HAPPEN.

HAVE STUDENTS CONDUCT INVESTIGATION #3: BUOYANT FORCE - VOLUME AND DENSITY.

USING THE OVERFLOW CAN, CATCH BUCKET, SPRING BALANCE, AND BLOCK, DEMONSTRATE THAT THE WEIGHT OF WATER DISPLACED IS EQUAL TO THE LOSS OF WEIGHT OF THE OBJECT (ARCHIMEDES' PRINCIPLE).

HAVE STUDENTS COMPLETE INVESTIGATION #4: FLOTATION AND DISPLACEMENT OF WATER. RELATE THE RESULTS TO THE BARGE.

SUGGEST THAT THE STUDENT'S VIEW TAPE #4 SECTION 5, TAPE #5 SECTION 1.

UNIT 2 FLUIDS - HYDRAULICS

OBJECTIVE: DESCRIBE THE OPERATION OF A HYDRAULIC PRESS, LIFT AND FORCE PUMP

FOCUS: TRANSMISSION OF PRESSURE, PUMPS

MATERIALS: FLUIDS UNIT PAK PP 33-40. VIDEO TAPE #5 UNIT 2, LONG TUBING OR STRAW, HYDRAULIC PRESS, LIFT PUMP, FORCE PUMP, BEAKER

METHOD: FOLLOW UNIT PAK, HANDOUTS PP 11-12 OF STUDENT WORKBOOK, DEMONSTRATION

VOCABULARY: HYDRAULIC MACHINE, PISTON, PUMP

NOTES

REVIEW FORCE, PRESSURE, DENSITY, AND SPECIFIC GRAVITY.

WITH AID OF THE HYDRAULIC PRESS AND THE DIAGRAM ON PP 11 OF STUDENT WORKBOOK, DISCUSS THE OPERATION OF A HYDRAULIC PRESS. SHOW AND DISCUSS EXAMPLES OF HYDRAULIC PRESSES FOUND IN THE HAMLET (JACKS, DENTIST'S CHAIR, BRAKES, ETC.). USE THE EXAMPLE ON PP 34-35 OF UNIT PAK TO SHOW MECHANICAL ADVANTAGE.

EXPLAIN THAT A PUMP IS A DEVICE THAT REMOVES AIR FROM A PIPE AND ALLOWS A LIQUID TO FLOW. DEMONSTRATE WITH A STRAW OR TUBE. DISCUSS HOW HIGH THE WATER WILL RISE IF ALL THE AIR WAS REMOVED.

DISCUSS AND DEMONSTRATE THE OPERATION OF A LIFT PUMP, PAYING PARTICULAR ATTENTION TO THE VALVE MOVEMENT.

DISCUSS AND DEMONSTRATE THE OPERATION OF A FORCE PUMP AND A FORCE PUMP WITH A PRESSURIZED DOME. POINT OUT THE ADVANTAGES OVER A LIFT PUMP.

SUGGEST THAT THE STUDENT'S VIEW TAPE #5 SECTION 2.

UNIT 2 FLUIDS - HYDRAULICS

OBJECTIVE: DEMONSTRATE THE PRACTICAL APPLICATIONS OF THE UNIT'S CONCEPTS BY TOURING THE HAMLET GARAGE.

FOCUS: HYDRAULIC DEVICES, MECHANICAL ADVANTAGE

MATERIALS: VARIOUS HYDRAULIC PUMPS, JACKS, LOADERS, BRAKING SYSTEMS, HYDRAULIC FLUIDS

METHOD: TOUR OF THE HAMLET GARAGE

VOCABULARY: HYDRAULIC FLUID, JACKS, HYDRAULIC PUMPS

NOTES

HAVE THE MECHANIC DEMONSTRATE VARIOUS HYDRAULIC PUMPS.

DEMONSTRATE THE OPERATION AND MECHANICAL ADVANTAGE OF A HYDRAULIC JACK.

DISCUSS AND DEMONSTRATE THE OPERATION OF VARIOUS BRAKING SYSTEMS.

SHOW THE OPERATION OF A LOADER.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 3 SIMPLE MACHINES - WORK, POWER, HORSEPOWER

OBJECTIVE: TO DEFINE WORK, FORCE, DISTANCE, POWER AND HORSEPOWER. CALCULATE THE ABOVE IN SI AND BRITISH UNITS.

FOCUS: DEFINITION OF BASIC CONCEPTS AND THE CALCULATION OF THEIR VALUES IN SI AND BRITISH UNITS.

MATERIALS: SIMPLE MACHINES UNIT PAK PP 1-21A. ABE INTERMEDIATE SCIENCE SIMPLE MACHINES PP 4-17. VIDEO TAPE #10 SECTIONS 1-3, SPRING BALANCE, BLOCKS

METHOD: FOLLOW UNIT PAK. DEMONSTRATION.

VOCABULARY: WORK, DISTANCE, FORCE, DYNES, JOULES, POWER, WATTS

NOTES

REVIEW FORCE, DEFINE DISTANCE AND WORK. GIVE SOME EXAMPLES WHERE WORK IS BEING DONE AND WHERE WORK IS NOT BEING DONE (PP 2 OF UNIT PAK).

DISCUSS EXAMPLE 1 ON PP 3 WITH THE STUDENTS. DEFINE THE BRITISH UNITS OF WORK. PRACTICE CONVERTING KILOGRAMS TO NEWTONS. USE THE SPRING BALANCE CALIBRATION AS AN AID. PRACTISE MANIPULATING THE FORMULA TO SOLVE FOR ANY VALUE GIVEN THE OTHER TWO (PP 4). INTRODUCE SI UNITS. DEFINE JOULES. PRACTISE MANIPULATING THE FORMULA USING SI UNITS.

DEFINE POWER AND ILLUSTRATE ITS CALCULATION USING THE EXAMPLES OF PP 7. DEFINE WATTS. DEFINE HORSEPOWER AND DEMONSTRATE ITS CALCULATION (EXAMPLES ON PP 10).

SUGGEST THE STUDENT'S VIEW TAPE #10 SECTIONS 1-3.

ASSIGN ADDITIONAL PROBLEMS ON MANIPULATING THE FORMULA FOR WORK FOR HOMEWORK.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 3 SIMPLE MACHINES - DEFINITION, FRICTION

OBJECTIVE: DEFINE A SIMPLE MACHINE. DEFINE FRICTION AND EXAMINE ITS ADVANTAGES AND DISADVANTAGES.

FOCUS: DEFINITION OF BASIC CONCEPTS AND THE CALCULATION OF FRICTION IN SI AND BRITISH UNITS.

MATERIALS: SIMPLE MACHINES UNIT PAK PP 12-21A. INTERMEDIATE SCIENCE SIMPLE MACHINES PP 28-29. VIDEO TAPE #10 SECTION 4, SPRING BALANCE, BLOCKS, SANDPAPER, OIL

METHOD: FOLLOW UNIT PAK. DEMONSTRATION.

VOCABULARY: SIMPLE MACHINE, FRICTION, STATIC FRICTION, DYNAMIC FRICTION

NOTES

REVIEW THE HOMEWORK.

DEFINE A SIMPLE MACHINE. DISCUSS AND HAVE THE STUDENTS GIVE EXAMPLES OF SIMPLE MACHINES.

DEFINE FRICTION. USE THE SPRING BALANCE AND THE BLOCK TO DEMONSTRATE STATIC AND DYNAMIC FRICTION. DISCUSS SOME DISADVANTAGES OF FRICTION AND HOW IT IS REDUCED. PLACE SOME OIL ON THE TABLE AND PULL THE BLOCK. RECORD THE FORCE.

DISCUSS SOME ADVANTAGES OF FRICTION AND HOW IT CAN BE INCREASED. PLACE SOME SANDPAPER ON THE TABLE AND PULL THE BLOCK. RECORD THE FORCE. DISCUSS THE EFFECT OF FRICTION (HEAT, EROSION, MORE WORK).

SUGGEST THE STUDENT'S VIEW TAPE #10 SECTION 4.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 3 SIMPLE MACHINES - INCLINED PLANE

OBJECTIVE: RECOGNIZE AN INCLINED PLANE AND STATE ITS PURPOSE. DEFINE ACTUAL MECHANICAL ADVANTAGE AND THEORETICAL MECHANICAL ADVANTAGE.

FOCUS: INTRODUCE DEFINITIONS AND FORMULAE FOR CALCULATION

MATERIALS: SIMPLE MACHINES UNIT PAK PP 22-31A. ABE INTERMEDIATE SCIENCE SIMPLE MACHINES PP 38-46. VIDEO TAPE #11 SECTIONS 1-3, SPRING BALANCE, BLOCKS, INCLINED PLANE, METER STICK, PAPER CUT INTO A TRIANGLE, PENCIL.

METHOD: FOLLOW UNIT PAK, DEMONSTRATIONS

VOCABULARY: INCLINED PLANE, WEDGE, SCREW, ACTUAL MECHANICAL ADVANTAGE, THEORETICAL MECHANICAL ADVANTAGE, RESISTANCE, EFFORT, DISTANCE EFFORT, DISTANCE RESISTANCE

NOTES

REVIEW CONCEPTS OF WORK, POWER, AND FRICTION.

DISCUSS WITH THE STUDENTS SOME EXAMPLES OF RAMPS. HAVE THEM EXPLAIN HOW THE RAMPS WERE USEFUL. EXAMINE SOME TYPES OF INCLINED PLANES THAT ARE NOT AS APPARENT AS A RAMP, EG, WEDGE, KNIFE, CHISEL, SCREW, ETC.

TAKE THE PAPER CUT INTO A TRIANGLE AND MARK THE HYPOTENUSE WITH A COLORED MARKER. WRAP IT AROUND THE PENCIL. DISCUSS HOW A SCREW IS AN INCLINED PLANE.

DISCUSS THE ADVANTAGES AND DISADVANTAGES OF INCLINED PLANES.

DEFINE ACTUAL MECHANICAL ADVANTAGE AND THEORETICAL MECHANICAL ADVANTAGE. DEMONSTRATE USING THE BLOCK, SPRING BALANCE, METER STICK, AND INCLINED PLANE.

PRACTICE MANIPULATING THE FORMULAE (EXAMPLES PP 29,30). DISCUSS WHY ACTUAL IS LESS THAN THEORETICAL.

ASSIGN THE QUESTIONS ON PP 31 FOR HOMEWORK.

SUGGEST THE STUDENTS VIEW TAPE #11 SECTIONS 1-3 ON THEIR OWN TIME.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 3 SIMPLE MACHINES - INCLINED PLANE

OBJECTIVE: DEFINE OUTPUT WORK, INPUT WORK, AND EFFICIENCY.

FOCUS: INTRODUCE DEFINITIONS AND FORMULAE FOR CALCULATION

MATERIALS: SIMPLE MACHINES UNIT PAK PP 32-41A. ABE INTERMEDIATE SCIENCE SIMPLE MACHINES PP 38-46. VIDEO TAPE #11 SECTIONS 1-3, SPRING BALANCE, BLOCKS, INCLINED PLANE, METER STICK, PAPER CUT INTO A TRIANGLE, PENCIL.

METHOD: FOLLOW UNIT PAK, DEMONSTRATIONS

VOCABULARY: INCLINED PLANE, WEDGE, SCREW, ACTUAL MECHANICAL ADVANTAGE, THEORETICAL MECHANICAL ADVANTAGE, RESISTANCE, EFFORT, DISTANCE EFFORT, DISTANCE RESISTANCE, OUTPUT WORK, INPUT WORK, EFFICIENCY

NOTES

REVIEW CONCEPTS OF ACTUAL MECHANICAL ADVANTAGE, THEORETICAL MECHANICAL ADVANTAGE, RESISTANCE, EFFORT, DISTANCE EFFORT, DISTANCE RESISTANCE. REVIEW THE HOMEWORK ASSIGNMENT.

DEFINE OUTPUT WORK AND INPUT WORK. DEMONSTRATE USING THE SAME INCLINED PLANE AS THE PREVIOUS LESSON. DISCUSS WHY OUTPUT WORK IS ALWAYS LESS THAN INPUT WORK.

PRACTICE MANIPULATING THE FORMULAE (EXAMPLES PP 33-34).

DEFINE EFFICIENCY AND CALCULATE IT USING THE INCLINED PLANE. DO THE EXAMPLES OF PP 38,39.

ASSIGN QUESTIONS ON PP 40,41 FOR HOMEWORK.

SUGGEST THE STUDENTS VIEW TAPE #11 SECTIONS 1-3 ON THEIR OWN TIME.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 3 SIMPLE MACHINES - LEVERS

OBJECTIVE: IDENTIFY THE FULCRUM, EFFORT, RESISTANCE, EFFORT ARM AND RESISTANCE OF 1ST, 2ND, AND 3RD CLASS LEVERS. CALCULATE THE MECHANICAL ADVANTAGE OF LEVERS.

FOCUS: IDENTIFICATION OF KINDS OF LEVERS AND THEIR PURPOSES.

MATERIALS: SIMPLE MACHINES UNIT PAK PP 42-47. ABE INTERMEDIATE SCIENCE SIMPLE MACHINES PP 18-37. VIDEO TAPE #11 SECTIONS 4-5, TAPE #12 SECTIONS 1-3, SPRING BALANCE, MOMENT OF FORCE APPARATUS, WEIGHTS, SCISSORS, NAIL PULLER (HAMMER)

METHOD: FOLLOW UNIT PAK, DEMONSTRATION

VOCABULARY: EFFORT, RESISTANCE, DISTANCE EFFORT, DISTANCE RESISTANCE, FULCRUM, LEVER, AMA, TMA

NOTES

WITH AID OF THE MOMENT OF FORCE APPARATUS, DEFINE EFFORT, RESISTANCE, FULCRUM, DISTANCE EFFORT, DISTANCE RESISTANCE

INTRODUCE THREE CLASSES OF LEVER AND DEMONSTRATE THEM ON THE APPARATUS. DISCUSS PRACTICAL EXAMPLES OF EACH.

CLASS ONE... THE FULCRUM IS BETWEEN THE RESISTANCE AND EFFORT. EXAMPLE SCISSORS, CROW BAR, NAIL PULLER, JACKING UP ONE CORNER OF A TENT USING A 45 GALLON BARREL AND A 12 FOOT 2X4.

CLASS TWO...THE FULCRUM AND EFFORT ARE AT OPPOSITE ENDS OF THE LEVER. EFFORT AND FORCE ARE IN OPPOSITE DIRECTION. EXAMPLE A WHEEL BARROW, OR GETTING A SLED WHICH IS STRUCK IN WET SOFT SNOW OUT BY USING A TENT POLE TO PUSH UP THE BACK END.

CLASS THREE...THE FULCRUM AND RESISTANCE ARE AT OPPOSITE ENDS OF THE LEVER. EXAMPLE A SHOVEL, A FISHING POLE, AND FRONT END LOADER ARM AND BUCKET.

PRACTICE THESE CONCEPTS, QUESTIONS OF PP 44.

REVIEW MECHANICAL ADVANTAGE AND PRACTICE MANIPULATING THE FORMULAE (EXAMPLES PP 46).

SUGGEST STUDENTS VIEW TAPES #11 AND #12.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 3 SIMPLE MACHINES - LEVERS

OBJECTIVE: SOLVE PROBLEMS USING THE LAW OF LEVERS. DEFINE THE CENTRE OF GRAVITY.

FOCUS: IDENTIFICATION OF KINDS OF LEVERS AND THEIR PURPOSES.

MATERIALS: SIMPLE MACHINES UNIT PAK PP 47-58A. ABE INTERMEDIATE SCIENCE SIMPLE MACHINES PP 18-37. VIDEO TAPE #11 SECTIONS 4-5, TAPE #12 SECTIONS 1-3, SPRING BALANCE, MOMENT OF FORCE APPARATUS, SIMPLE MACHINE KITS, WEIGHTS

METHOD: FOLLOW UNIT PAK, DEMONSTRATION, INVESTIGATION

VOCABULARY: EQUILIBRIUM, TORQUE, CENTRE OF GRAVITY

NOTES

REVIEW THE 3 TYPES OF LEVERS. USE QUESTIONS ON PP 52 TO ASSIST THE REVIEW.

SET UP THE MOMENT OF FORCE APPARATUS WITH THE FULCRUM AT THE 50 CM MARK AND A 100 G MASS AT THE 80 CM MARK. HAVE THE STUDENTS GUESS WHERE THEY SHOULD PUT A 200 G MASS TO MAKE THE APPARATUS BALANCE. DISCUSS EQUILIBRIUM.

USING THE SIMPLE MACHINE KITS, COMPLETE INVESTIGATION #5.

DEFINE TORQUE. DEMONSTRATE CCW AND CW TORQUE. DEFINE THE LAW OF LEVERS: CCW TORQUE IS EQUAL TO CW TORQUE. PRACTICE MANIPULATING THE FORMULA (PP 49).

DEMONSTRATE THE CENTRE OF GRAVITY BY BALANCING AN IRREGULAR SHAPED OBJECT ON YOUR FINGER. DISCUSS HOW THE CENTRE OF GRAVITY CAN ASSIST OR HINDER THE OPERATION OF A LEVER USING THE MOMENT OF FORCE APPARATUS.

SUGGEST STUDENTS VIEW TAPES #11 AND #12.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 3 SIMPLE MACHINES - WHEEL AND AXLE

OBJECTIVE: RECOGNIZE THE WHEEL AND AXLE AS A SPECIAL KIND OF LEVER.

FOCUS: LEVERS CAN RESULT IN A GAIN IN FORCE AND A LOSS IN DISTANCE AND VICE VERSA.

MATERIALS: SIMPLE MACHINES UNIT PAK PP 59-60A. ABE INTERMEDIATE SCIENCE SIMPLE MACHINES PP 47-54. VIDEO TAPE #11 SECTIONS 4-5, TAPE #12 SECTIONS 1-3, SIMPLE MACHINE KITS

METHOD: FOLLOW UNIT PAK, DEMONSTRATION, INVESTIGATION

VOCABULARY: WHEEL AND AXLE, DIAMETER, RADIUS

NOTES

REVIEW THE LAW OF LEVERS.

WITH THE USE OF THE SIMPLE MACHINES KIT, DEFINE WHEEL AND AXLE. HAVE THE STUDENTS TWIST THE WHEEL AND THE AXLE AND DESCRIBE WHICH IS EASIER TO TURN. RELATE THIS TO A DOOR KNOB.

HAVE THE STUDENTS COMPLETE INVESTIGATION #6.

DIAGRAM EFFORT, RESISTANCE, DISTANCE EFFORT, AND DISTANCE RESISTANCE FOR THE STUDENTS AND SHOW HOW A WHEEL AND AXLE IS A SPECIAL EXAMPLE OF A LEVER.

SUGGEST STUDENTS VIEW TAPES #11 AND #12.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 3 SIMPLE MACHINES- THE PULLEY

OBJECTIVE: DEMONSTRATE THE USE OF FIXED AND MOBILE PULLEYS TO PRODUCE A GAIN IN FORCE OR CHANGE IN DIRECTION. CALCULATE MECHANICAL ADVANTAGE.

FOCUS: FIXED AND MOVABLE PULLEY, GAIN IN FORCE

MATERIALS: SIMPLE MACHINES UNIT PAX PP 61-69. ABE INTERMEDIATE SCIENCE SIMPLE MACHINES PP 46-54, 87-90. VIDEO TAPE #12 SECTIONS 4-6, SIMPLE MACHINE KITS

METHOD: FOLLOW UNIT PAX, DEMONSTRATION

VOCABULARY: FULCRUM, PULLEY, BLOCK AND TACKLE, FIXED, MOVABLE, SINGLE, MULTIPLE

NOTES

USE THE SIMPLE MACHINE KIT TO DEMONSTRATE A FIXED PULLEY (BLOCK AND TACKLE). SHOW THAT A FIXED, SINGLE PULLEY CAN CHANGE THE DIRECTION BUT DOES NOT GIVE A GAIN IN FORCE.

SET UP THE SIMPLE MACHINE KIT TO DEMONSTRATE A MOVABLE PULLEY. SHOW HOW THE EFFORT AND RESISTANCE ARE IN OPPOSITE DIRECTIONS.

USING THE FIXED AND MOVABLE PULLEY, SHOW THE DISTANCE RESISTANCE AND DISTANCE EFFORT. CALCULATE THE TMA FOR BOTH. DISCUSS WHY THE TMA FOR THE MOVABLE PULLEY IS GREATER THAN 1. GENERALIZE THE DISCUSSION FOR MORE THAN 1 PULLEY IN A SYSTEM, IE, TMA = NUMBER OF ROPES SUPPORTING THE MOVABLE PULLEYS.

DISCUSS QUESTIONS ON PP 66.

SOLVE THE PROBLEMS ON PP 67 WITH THE STUDENTS.

ASSIGN QUESTIONS ON PP 68 FOR HOMEWORK.

SUGGEST STUDENTS VIEW TAPE #12 SECTIONS 4,5.

UNIT 3 SIMPLE MACHINES- THE PULLEY

OBJECTIVE: DESCRIBE USES OF A PULLEY SYSTEM AND CALCULATE EFFICIENCY.

FOCUS: FIXED AND MOVABLE PULLEY, WORK INPUT, WORK OUTPUT, EFFICIENCY

MATERIALS: SIMPLE MACHINES UNIT PAX PP 69-75. ABE INTERMEDIATE SCIENCE SIMPLE MACHINES PP 46-54, 87-90. VIDEO TAPE #12 SECTIONS 4-6, SIMPLE MACHINE KITS

METHOD: FOLLOW UNIT PAX, DEMONSTRATION

VOCABULARY: FULCRUM, PULLEY, BLOCK AND TACKLE, FIXED, MOVABLE, SINGLE, MULTIPLE

NOTES

REVIEW THE HOMEWORK ASSIGNMENT.

DISCUSS EXAMPLES OF PULLEY SYSTEMS AND WHERE THEY ARE USED IN THE HAMLET. REVIEW USING QUESTIONS ON PP 70.

REVIEW FORMULAE FOR WORK AND EFFICIENCY. DO WITH THE STUDENTS THE QUESTION ON PP 71. DISCUSS WHY THE SYSTEM WAS NOT 100% EFFICIENT. GIVE THE STUDENTS SOME TIME TO TRY THE QUESTIONS ON PP 72. DISCUSS ANY PROBLEMS WITH THEM.

CALCULATE THE UNKNOWN QUANTITY IN THE EFFICIENCY FORMULA GIVEN THE OTHER QUANTITIES (PP 73).

ASSIGN UNSOLVED QUESTIONS FROM PP 72 AND QUESTIONS ON PP 74 FOR HOMEWORK.

SUGGEST STUDENTS VIEW TAPE #12 SECTION 6.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 3 SIMPLE MACHINES - GEAR DRIVEN SYSTEMS

OBJECTIVE: IDENTIFY THE DRIVEN AND DRIVING ELEMENTS OF A GEAR SYSTEM AND BE ABLE TO EXPRESS THE MECHANICAL AND GENERAL ADVANTAGES OF DIFFERENT ARRANGEMENTS OF THE VARIOUS COMPONENTS IN THE SYSTEM.

FOCUS: INTRODUCTION TO THE BASICS OF GEAR DRIVEN SYSTEMS.

MATERIALS: SIMPLE MACHINES UNIT PAX PP 76-84A. ABE INTERMEDIATE SCIENCE SIMPLE MACHINES PP 84-87. VIDEO TAPE #13 SECTION 1, SIMPLE MACHINE KITS.

METHOD: FOLLOW UNIT PAX, DEMONSTRATION, INVESTIGATION.

VOCABULARY: DRIVEN GEAR, DRIVING GEAR, IDLER GEAR, MESH, DIRECTION OF ROTATION, CIRCUMFERENCES, MECHANICAL ADVANTAGE.

NOTES

USING THE SIMPLE MACHINE KIT, DEFINE THE DRIVING GEAR AND THE DRIVEN GEAR.

HAVE THE STUDENTS COMPLETE INVESTIGATION #7. INTRODUCE THE IDLER GEAR CONCEPT AFTER THE INVESTIGATION.

REVIEW THE QUESTIONS ON PP 80.

DEFINE TMA FOR A GEAR SYSTEM.

$$\text{TMA} = \frac{\text{REVOLUTION OF DRIVEN GEAR}}{\text{REVOLUTION OF DRIVING GEAR}} \quad \text{OR}$$

$$\text{TMA} = \frac{\text{NUMBER OF TEETH ON DRIVEN WHEEL}}{\text{NUMBER OF TEETH ON DRIVING WHEEL}}$$

USE THE RESULTS FROM THE INVESTIGATION TO SHOW HOW THE TMA IS CALCULATED.

DESCRIBE PRACTICAL APPLICATIONS OF GEAR SYSTEMS. HAVE THE STUDENTS LIST EXAMPLES OF GEAR SYSTEMS.

ASSIGN THE QUESTIONS ON PP 82 FOR HOMEWORK.

SUGGEST THAT THE STUDENTS VIEW TAPE #13 ON THEIR OWN TIME.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 3 SIMPLE MACHINES - BELT DRIVEN SYSTEMS

OBJECTIVE: IDENTIFY THE DRIVEN AND DRIVING ELEMENTS OF A BELT SYSTEM AND BE ABLE TO EXPRESS THE MECHANICAL AND GENERAL ADVANTAGES OF DIFFERENT ARRANGEMENTS OF THE VARIOUS COMPONENTS IN THE SYSTEM.

FOCUS: INTRODUCTION TO THE BASICS OF BELT DRIVEN SYSTEMS.

MATERIALS: SIMPLE MACHINES UNIT PAX PP 85-92A. VIDEO TAPE #13 SECTION 2, SIMPLE MACHINE KITS.

METHOD: FOLLOW UNIT PAX, DEMONSTRATION, INVESTIGATION.

VOCABULARY: DRIVEN GEAR, DRIVING GEAR, DIRECTION OF ROTATION, CIRCUMFERENCES, MECHANICAL ADVANTAGE.

NOTES

REVIEW HOMEWORK ASSIGNMENT.

USING THE SIMPLE MACHINE KIT, DEFINE THE DRIVING GEAR AND THE DRIVEN GEAR.

HAVE THE STUDENTS COMPLETE INVESTIGATION #8.

DEFINE TMA FOR A BELT SYSTEM.

$$\text{TMA} = \frac{\text{CIRCUMFERENCE OF DRIVEN WHEEL}}{\text{CIRCUMFERENCE OF DRIVING WHEEL}}$$

USE THE RESULTS FROM THE INVESTIGATION TO SHOW HOW THE TMA IS CALCULATED.

DO QUESTIONS ON PP 90 WITH THE STUDENTS.

DESCRIBE PRACTICAL APPLICATIONS OF BELT SYSTEMS. HAVE THE STUDENTS LIST EXAMPLES OF BELT SYSTEMS. WHY WOULD YOU USE A BELT SYSTEM INSTEAD OF A GEAR SYSTEM.

SUGGEST THAT THE STUDENTS VIEW TAPE #13 ON THEIR OWN TIME.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 3 SIMPLE MACHINES - TOUR

OBJECTIVE: IDENTIFY THE PRACTICAL USES OF SIMPLE MACHINES ON A WORKSITE.

FOCUS: USES OF INCLINED PLANES, LEVERS, PULLEYS, AND GEAR AND BELT SYSTEMS.

MATERIALS: CONSTRUCTION SITE.

METHOD: TOUR.

VOCABULARY: REVIEW OF UNIT'S VOCABULARY.

NOTES

TOUR OF A COMMUNITY CONSTRUCTION SITE.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 4 HEAT AND TEMPERATURE - EFFECTS OF HEAT

OBJECTIVE: DESCRIBE THE KINETIC MOLECULAR THEORY. EXPLAIN HOW HEATING AND COOLING AFFECTS THE SIZE AND VOLUME OF SOLIDS, LIQUIDS, AND GASES.

FOCUS: INTRODUCTION TO THE BASIC PROPERTIES OF HEAT ON SOLIDS, LIQUIDS, AND GASES.

MATERIALS: HEAT AND TEMPERATURE UNIT PAX PP 1-23. VIDEO TAPE #6 UNITS 1-7, MOLECULAR MODEL SET, MOLECULAR VIBRATION TUBE, STANDS, RINGS, HEAT SOURCE, HOLDERS, BALL AND RING, FLASKS, LARGE BEAKERS, GLASS TUBING, 1-HOLE RUBBER STOPPERS, FOOD COLOURING.

METHOD: FOLLOW UNIT PAX, HANDOUT PP 1-11 OF STUDENT HANDBOOK, DEMONSTRATION, INVESTIGATIONS

VOCABULARY: MATTER, ATOMS, MOLECULES, KINETIC ENERGY, KINETIC MOLECULAR THEORY, EXPANSION AND CONTRACTION, COMPRESSION AND EXPANSION

NOTES

BRIEFLY REVIEW THE MOLECULAR STRUCTURE OF ATOMS USING THE MOLECULAR MODEL SET AND DESCRIBE THE STATES OF MATTER. REVIEW POTENTIAL AND KINETIC ENERGY.

DO INVESTIGATION #9.

SPLIT THE STUDENTS INTO 3 GROUPS AND HAVE GROUP 1 DO INVESTIGATION #10, GROUP 2 INVESTIGATION #11, AND GROUP 3 INVESTIGATION #12.

HAVE EACH GROUP EXPLAIN THE INVESTIGATION AND RESULTS TO THE OTHERS.

DISCUSS HOW BUILDERS COMPENSATE FOR THE EXPANSION AND CONTRACTION OF MATERIALS IN CONSTRUCTION.

REVIEW THE PECULIAR BEHAVIOUR OF WATER BETWEEN 4C AND 0C. EXAMINE WHY IT IS IMPORTANT TO CONSIDER THIS PROPERTY IN CONSTRUCTION, EG, FREEZING OF PIPES.

USE THE PULSE GLASS TO RE-INFORCE THE CONCEPT OF EXPANSION OF GASES. DISCUSS THE AMOUNT OF EXPANSION AND CONTRACTION OF SOLIDS, LIQUIDS, AND GASES IN RELATION TO THE KINETIC MOLECULAR THEORY.

HAVE THE STUDENTS REVIEW TAPE #6, SECTIONS 1-7 ON THEIR OWN TIME.

UNIT 4 HEAT AND TEMPERATURE - TRANSMISSION OF HEAT

OBJECTIVE: DESCRIBE HOW HEAT IS TRANSFERRED BY CONDUCTION, CONVECTION, AND RADIATION. EXPLAIN WHAT MAKES A GOOD OR POOR CONDUCTOR, CONVECTOR, AND RADIATOR OF HEAT.

FOCUS: CONDUCTION, CONVECTION, RADIATION

MATERIALS: HEAT AND TEMPERATURE UNIT PAX PP 24-57. VIDEO TAPE #6 SECTIONS 8-11, TAPE #7 SECTIONS 1-6, WAX, ALUMINUM ROD, TACK, 5-ROD CONDUCTOMETER, TEST TUBE, ICE, SMALL LEAD WEIGHT, LIQUID CONVECTION APPARATUS, SMOKE BOX, SMOKE PAPER, CANDLE, RADIOMETER, U-SHAPED GLASS TUBE, 2-HOLE STOPPERS, GLASS CYLINDER, GLASS TUBING, RADIATION CANS, THERMOS BOTTLE

METHOD: FOLLOW UNIT PAX, HANDOUTS PP 12-26 OF STUDENT HANDBOOK, OVERHEADS OF HEATING SYSTEMS, DEMONSTRATIONS, INVESTIGATIONS.

VOCABULARY: CONDUCTION, CONDUCTORS, COLLISION, CONVECTION, CIRCULATION, RADIATION, ABSORBERS, INSULATORS.

NOTES

DEFINE CONDUCTION USING THE EXAMPLE OF LEAVING A SPOON IN A HOT LIQUID. CONDUCT A DEMONSTRATION WITH THE ALUMINUM ROD AND TACK.

USE THE 5-ROD CONDUCTOMETER TO SHOW THAT SOME SOLIDS CONDUCT HEAT BETTER THAN OTHERS. EXPLAIN WHY THIS IS TRUE WITH REFERENCE TO THE KINETIC MOLECULAR THEORY. SHOW EXAMPLES OF HOW GOOD AND POOR CONDUCTORS ARE USED, EG., HANDLES ARE MADE OF PLASTIC OR WOOD WHILE POTS ARE MADE OF ALUMINUM OR IRON.

DEMONSTRATE THAT A LIQUID IS A POOR CONDUCTOR BY FOLLOWING THE DISCUSSION ON PP 31-32.

HAVE THE STUDENTS COMPLETE INVESTIGATION #13.

USING THE LIQUID CONVECTION APPARATUS, DEMONSTRATE THE EFFECTS OF TEMPERATURE ON THE MOVEMENT OF A LIQUID. DISCUSS CONVECTION. USE THE CONVECTION OF A GAS APPARATUS TO EXPAND THE CONCEPT TO GASES. DISCUSS GOOD AND POOR CONVECTORS OR HEAT AND FACTORS WHICH DETERMINE THE DEGREE OF CONVECTION.

EXPLAIN RADIATION AND RADIATORS. USE THE RADIOMETER TO DESCRIBE THE EFFECT. USE THE RADIATION CANS TO DEMONSTRATE GOOD AND POOR ABSORBERS. DISCUSS AND GIVE EXAMPLES.

HAVE THE STUDENTS COMPLETE INVESTIGATION #14. USE THE RESULTS TO DISCUSS A HOT WATER HEATING SYSTEM. WITH THE AID OF THE OVERHEADS, DISCUSS A HOT-AIR HEATING SYSTEM AND A STEAM SYSTEM.

DISCUSS INSULATION. USE THE CUT AWAY OF A VACUUM THERMOS BOTTLE. SKETCH ON BOARD AND DISCUSS THE MOLECULAR ACTION OF THE LIQUID AS TRANSFERRED TO THE METAL, AND THE USE OF A VACUUM AS AN INSULATOR AND THE EXTERIOR WALL.

DISCUSS GOOD CONDUCTORS AND INSULATORS AND THEIR APPLICATION IN ELECTRICAL WIRING, TOASTERS, HEATERS, COPPER POTS WITH WOODEN HANDLES, HEAT TAPE ETC.

REVIEW THE TOPIC WITH HELP ON TABLE ON PP 57.

SUGGEST STUDENTS VIEW VIDEO TAPES #6 AND #7 ON THEIR OWN TIME.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 4 HEAT AND TEMPERATURE - TEMPERATURE

OBJECTIVE: DEFINE TEMPERATURE. EXAMINE BOILING AND FREEZING POINTS ON THE FAHRENHEIT AND CELSIUS SCALES. DESCRIBE 4 TYPES OF NON-LIQUID THERMOMETERS.

FOCUS: TEMPERATURE SCALES

MATERIALS: HEAT AND TEMPERATURE UNIT PAX PP 58-70A. VIDEO TAPE 7 SECTION 7, THERMOMETER, BIMETAL STRIP, HEAT SOURCE

METHOD: FOLLOW UNIT PAX, HANDOUTS PP 27-28 OF STUDENT HANDBOOK, DEMONSTRATION.

VOCABULARY: TEMPERATURE, THERMOMETER, DEGREE, BOILING AND FREEZING POINTS, FAHRENHEIT AND CELSIUS SCALES, PYROMETER, BIMETAL, GAS, THERMO-COUPLE THERMOMETERS

NOTES

DEFINE TEMPERATURE AND DEMONSTRATE HOW THE THERMOMETER MEASURES IT. RELATE THE DISCUSS TO THE KINETIC MOLECULAR THEORY.

DEFINE DEGREE, BOILING AND FREEZING POINTS AND ROOM TEMPERATURE. SHOW THEM ON THE THERMOMETER.

DESCRIBE 4 TYPES OF NON-METAL THERMOMETERS AND THEIR USES. USE THE BIMETAL STRIP TO DEMONSTRATE THE EXPANSION PROPERTIES OF METALS.

SUGGEST STUDENTS VIEW VIDEO TAPES #7 ON THEIR OWN TIME.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 4 HEAT AND TEMPERATURE - MEASUREMENT OF HEAT

OBJECTIVE: DEFINE HEAT, CALORIE, JOULE, AND BRITISH THERMAL UNIT. COMPUTE HEAT IN DIFFERENT MEASUREMENT SYSTEMS. EXPLAIN THE HEAT OF COMBUSTION FOR A SOLID, LIQUID AND GAS. DEFINE KILOCALORIE.

FOCUS: INTRODUCTION TO THE MEASUREMENT OF HEAT.

MATERIALS: HEAT AND TEMPERATURE UNIT PAX PP 71-85A. VIDEO TAPE #8, 2-250 ML BEAKERS, 2-500 ML BEAKERS, STANDS, HEAT SOURCE, THERMOMETERS.

METHOD: FOLLOW UNIT PAX, HANDOUT PP 29-32 OF STUDENT WORKBOOK, DEMONSTRATION, INVESTIGATION.

VOCABULARY: HEAT, CALORIES, JOULES, BTU

NOTES

DEFINE HEAT. REFER TO THE EXAMPLES ON PP 71.

HAVE THE STUDENTS CONDUCT INVESTIGATION #15.

DEFINE A BRITISH THERMAL UNIT (BTU), CALORIE, AND JOULE. GIVE PRACTICAL EXAMPLES OF EACH (PP 74). EXPLAIN THE FORMULA FOR HEAT.

DO THE EXAMPLES OF PP 77-78 WITH THE STUDENTS. ASSIGN QUESTIONS ON PP 79 FOR HOMEWORK.

EXPLAIN THE HEAT OF COMBUSTION AND USE THE CHART ON PP 80 TO EXAMINE VARIOUS FUELS AND FOODS. CONTINUE THE DISCUSSION USING THE TABLE OF PP 84 AND QUESTIONS ON PP 85.

SUGGEST THE STUDENTS VIEW TAPE #8.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 4 HEAT AND TEMPERATURE - BOILING

OBJECTIVE: DEFINE THE BOILING POINT OF A LIQUID. EXAMINE THE RELATIONSHIP BETWEEN BOILING POINT AND ATMOSPHERIC PRESSURE. DEFINE LATENT HEAT OF VAPORIZATION AND FUSION.

FOCUS: BOILING AND ATMOSPHERIC PRESSURE.

MATERIALS: HEAT AND TEMPERATURE UNIT PAX PP 86-103A. VIDEO TAPE #8, SECTIONS 1-3, 1-250 ML FLASK, 2-HOLE STOPPER, THERMOMETER, GLASS TUBE, RUBBER HOSE, CLAMP, HEAT SOURCE.

METHOD: FOLLOW UNIT PAX, HANDOUT PP 33-36 OF STUDENT WORKBOOK, DEMONSTRATION.

VOCABULARY: VAPOUR PRESSURE, STANDARD ATMOSPHERE, LATENT HEAT OF VAPORIZATION AND FUSION.

NOTES

REVIEW HOMEWORK ASSIGNMENT.

DEFINE THE BOILING POINT IN TERMS OF VAPOUR PRESSURE. STATE THE BOILING POINT UNDER STANDARD ATMOSPHERE AND AT DIFFERENT ALTITUDES (PP 89). GIVE SOME EXAMPLES OF THE DIFFERENCES.

CONDUCT THE DEMONSTRATION AS OUTLINED ON PP 90-92.

DISCUSS HOW THE BOILING POINT IS INCREASED IF THE PRESSURE IS INCREASED. GIVE SOME PRACTICAL EXAMPLES OF HOW THIS IS USED (PP 95).

REFER BACK TO THE STUDENT'S INVESTIGATION #2 AND DISCUSS WHY THE TEMPERATURE DID NOT CHANGE WHEN THE LIQUID TURNED TO A GAS. INTRODUCE THE LATENT HEAT OF VAPORIZATION. USE A SIMILAR DISCUSSION TO INTRODUCE THE LATENT HEAT OF FUSION.

SUGGEST THE STUDENTS VIEW TAPE #9.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 4 HEAT AND TEMPERATURE - EVAPORATION AND CONDENSATION

OBJECTIVE: DEFINE EVAPORATION AND ITS RELATIONSHIP WITH ATMOSPHERIC PRESSURE AND BOILING WATER. STATE THE FACTORS WHICH AFFECT THE RATE OF EVAPORATION. DESCRIBE A REFRIGERATION SYSTEM. DEFINE HUMIDITY AND RELATIVE HUMIDITY.

FOCUS: EVAPORATION AND CONDENSATION.

MATERIALS: HEAT AND TEMPERATURE UNIT PAX PP 104 - 120A. VIDEO TAPE #9, SECTIONS 4-5, WATCH GLASS, ETHER, WOOD BLOCK, WATER, BEAKER, THERMOMETER, ICE.

METHOD: FOLLOW UNIT PAX, HANDOUT PP 38-41 OF STUDENT WORKBOOK, DEMONSTRATION, INVESTIGATION.

VOCABULARY: EVAPORATION, CONDENSATION, FREON, SULPHUR DIOXIDE, ABSOLUTE HUMIDITY, RELATIVE HUMIDITY, MUGGY, DEW POINT, HYGROMETER.

NOTES

DEFINE EVAPORATION. EXPLAIN WHY EVAPORATION RESULTS IN COOLING USING THE KINETIC MOLECULAR THEORY. GIVE EXAMPLES (PP 104).

CONDUCT THE DEMONSTRATION ON PP 105-107.

DISCUSS THE FACTORS THAT AFFECT THE RATE OF EVAPORATION.

USING THE FIGURE ON PP 110, DESCRIBE HOW EVAPORATION AND CONDENSATION ARE IMPORTANT IN REFRIGERATION.

DEFINE ABSOLUTE AND RELATIVE HUMIDITY. GIVE EXAMPLES OF HOW THE HUMIDITY CHANGES WITH TEMPERATURE AND HOW RELATIVE HUMIDITY AFFECTS US. USE THE QUESTIONS ON PP 114 FOR A REVIEW.

HAVE THE STUDENTS COMPLETE INVESTIGATION #16.

DISCUSS A HYGROMETER AND ITS USES.

SUGGEST THE STUDENTS VIEW TAPE #9.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

UNIT 4 HEAT AND TEMPERATURE

OBJECTIVE: TO SEE PRACTICAL APPLICATIONS OF THE UNIT'S TOPICS BY TOURING THE HOUSING ASSOCIATION.

FOCUS: CONSTRUCTION TECHNIQUES RELATED TO UNIT.

MATERIALS:

METHOD: TOUR OF HOUSING ASSOCIATION.

VOCABULARY: CONSTRUCTION TERMINOLOGY.

NOTES

VIEW HEATING SYSTEMS, INSULATION TECHNIQUES, AND OTHER CONSTRUCTION ACTIVITIES RELATED TO HEAT AND TEMPERATURE.

SCIENCE INVESTIGATIONS

INVESTIGATION #1: MEASURING VOLUME BY THE DISPLACEMENT OF WATER

FOLLOW EXPERIMENT OUTLINED ON PP 10-11 OF MATTER STUDENT HANDBOOK.

INVESTIGATION #2: RECORDING MELTING AND BOILING TEMPERATURES

FOLLOW EXPERIMENT OUTLINED ON PP 13-14 OF MATTER STUDENT HANDBOOK.

INVESTIGATION #3: BUOYANT FORCE - VOLUME AND DENSITY

FOLLOW EXPERIMENT OUTLINED ON PP 5-6 OF FLUIDS STUDENT HANDBOOK.

INVESTIGATION #4: FLOTATION AND DISPLACEMENT OF WATER

FOLLOW EXPERIMENT OUTLINED ON PP 9-10 OF FLUIDS STUDENT HANDBOOK.

INVESTIGATION #5: SIMPLE BALANCE AND TAKING DATA

FOLLOW EXPLORATION 1 AND 2 ON PP 2-3 OF SIMPLE MACHINES DISCOVERY KIT.

INVESTIGATION #6: WHEELS AND AXLES

FOLLOW EXPLORATION 1 AND 2 ON PP 4-5 OF SIMPLE MACHINES DISCOVERY KIT.

INVESTIGATION #7: TWO AND THREE GEAR SYSTEMS

FOLLOW EXPLORATION 1, 2, AND 3 ON PP 9-10 OF SIMPLE MACHINES DISCOVERY KIT.

INVESTIGATION #8: BELT DRIVE SYSTEMS

FOLLOW EXPLORATION 4 ON PP 1-12 OF SIMPLE MACHINES DISCOVERY KIT.

APPRENTICESHIP SCIENCE PROGRAM
INSTRUCTIONAL NOTES

INVESTIGATION #9: VIBRATION TUBE

FOLLOW EXPERIMENT OUTLINED ON PP 2-3 OF HEAT AND TEMPERATURE STUDENT HANDBOOK.

INVESTIGATION #10: HOW HEATING AND COOLING AFFECT THE SIZE OF SOLIDS

FOLLOW EXPERIMENT OUTLINED ON PP 5 OF HEAT AND TEMPERATURE STUDENT HANDBOOK.

INVESTIGATION #11: HEATING A LIQUID

FOLLOW EXPERIMENT OUTLINED ON PP 7 OF HEAT AND TEMPERATURE STUDENT HANDBOOK.

INVESTIGATION #12: EXPANSION AND CONTRACTION IN GASES

FOLLOW EXPERIMENT OUTLINED ON PP 10-11 OF HEAT AND TEMPERATURE STUDENT HANDBOOK.

INVESTIGATION #13: CONVECTION CURRENTS

FOLLOW EXPERIMENT OUTLINED ON PP 19-20 OF HEAT AND TEMPERATURE STUDENT HANDBOOK.

INVESTIGATION #14: HOT WATER HEATING SYSTEM

FOLLOW EXPERIMENT OUTLINED ON PP 22-23 OF HEAT AND TEMPERATURE STUDENT HANDBOOK.

INVESTIGATION #15: HEAT VS. TEMPERATURE

FOLLOW THE EXPERIMENT OUTLINED ON PP 31-32 OF HEAT AND TEMPERATURE STUDENT HANDBOOK.

INVESTIGATION #16: DEW POINT

FOLLOW EXPERIMENT OUTLINED ON PP 41 OF HEAT AND TEMPERATURE STUDENT HANDBOOK.

SCIENCE EQUIPMENT ORDER

QTY	CATALOGUE NUMBER	DESCRIPTION	UNIT PRICE	TOTAL
2	61366-02	10x0.2 Polypropylene Cylinder	2.65	5.30
2	61366-03	25x0.5 Polypropylene Cylinder	3.20	6.40
2	61366-07	50x1 Polypropylene Cylinder	4.01	8.02
2	61366-08	100x1 Polypropylene Cylinder	5.37	10.74
2	61366-12	250x2 Polypropylene Cylinder	6.73	13.46
4	60632-07	50 ml Pyrex Beaker	2.34	9.36
4	60632-08	100 ml Pyrex Beaker	2.50	10.00
4	60632-12	250 ml Pyrex Beaker	2.34	9.36
4	60632-14	400 ml Pyrex Beaker	2.80	11.20
4	60632-16	600 ml Pyrex Beaker	3.52	14.08
2	60632-18	1000 ml Pyrex Beaker	6.69	13.38
2	60632-20	2000 ml Pyrex Beaker	13.29	26.58
2	61750-12	250 ml Boiling Flask Flat Bottom Pyrex	5.07	10.14
2	61750-15	500 ml Boiling Flask Flat Bottom Pyrex	6.60	13.20
1	61976-05	Biology Glass Tubing Assortment	14.82	14.82
2	62903-02	Tubing - Rigid Plastic	0.88	1.76
1	62895-03F	Amber Latex Tubing Sulfur Free	6.30	6.30
1	61986	Glass Tubing Cutter	11.97	11.97
1	61130-01	Tubing Clamp - Hoffman Screw	1.52	1.52
1	62865	Rubber Stopper Assortment 3 lb. 00-9	26.60	26.60
1	61245	Cork Assortment 0-11	8.09	8.09
1	61260-09	Cork Bore Set With Handles 3/16-21/32	22.80	22.80
4	63580-25	2 1/2 in. Watch Glasses - Pyrex	1.20	4.80
4	63580-04	4 in. Watch Glasses - Pyrex	1.56	6.24
2	63235	Test Tube Clamp - Improved Design	2.04	4.08
4	61090-05	Buret Clamp - V Jaw	8.30	33.20
4	61126	Thermometer Clamp	11.97	47.88
4	61915-06	Wire Gauze 6" x 6"	1.84	7.36
4	63455-03	Triangles - Pipestem 2 1/2"	1.63	6.52
4	63100-02	Support Base With Rod and Rings	31.30	125.20
1	63100-03	Support Base With Rod and Rings	43.20	43.20
4	62011-01	Plastic Chemical Goggles	4.56	18.24
1	S64578	Refillable Torch with Stand	48.90	48.90
2	69610	Hot Hand Protector	15.30	30.60
2	69980-01	Dual Calibration Spring Scale 250g/2.5N	5.02	10.04
2	69980-05	Dual Calibration Spring Scale 500g/5N	5.02	10.04
2	69980-10	Dual Calibration Spring Scale 1kg/10N	5.02	10.04
2	69980-20	Dual Calibration Spring Scale 2kg/20N	5.02	10.04
2	69980-50	Dual Calibration Spring Scale 5kg/50N	5.02	10.04
1	60375	Triple Beam Balance	131.00	131.00
1	60392	Attachment Weight Set	32.80	32.80
4	63346	Standard Lab Thermometer	8.60	34.40
4	68935-01	Four-Sided Metre Stick	8.09	32.36
1	62911	Metric Steel Tapes 15 Metres	23.50	23.50
2	66837	Metric Vernier Caliper	10.34	20.68
2	62590	Metric Caliper Micrometer	36.10	72.20
1	62609	Molecular Vibration Tube	25.90	25.90
1	62607	Student Organic Structure Set	26.90	26.90
1	62605	Modelling Clay	3.67	3.67
1	64365	Specific Gravity Blocks Set	34.60	34.60
1	64371	Density Cylinder Set	21.30	21.30

1	61401-01	Density Specimen Cylinder Loaded	6.73	6.73
1	61401-02	Density Specimen Cylinder	2.99	2.99
1	61401-03	Density Specimen Block Loaded	5.10	5.10
1	61401-04	Density Specimen Block	2.99	2.99
1	61401-05	Density Specimen Block	5.64	5.64
1	68949	Open Manometer	51.00	51.00
1	60546	Demonstration Barometer-Aneroid	88.00	88.00
1	1048	Mariotte's Cylinder	29.03	29.03
1	68697	Nalgene Vacuum Pump - Hand Operated	61.25	61.25
1	62255	Glass Lift Pump	16.70	16.70
1	61765	Glass Force Pump	16.70	16.70
1	62090	Glass Hydraulic Press	28.60	28.60
1	61226-01	Heat Conductometer	21.65	21.65
1	61229-01	Gas Convection Apparatus	31.10	31.10
1	63440-12	Touch Paper (pkg of 12)	6.12	6.12
1	61228	Liquid Convection Apparatus	20.75	20.75
1	61205	Compound Bar	6.12	6.12
1	62800	Radiometer	11.22	11.22
1	60520	Ball and Ring Apparatus	17.50	17.50
1	66917	Radiation Cans	9.45	9.45
1	62790	Pulse Glass	13.94	13.94
1	66540	Moment of Force Apparatus	108.00	108.00
1	65559-05	Discover Simple Machines Kit	44.20	44.20
1	62150	Inclined Plane	26.60	26.60
1	62035	Halls Carriage	14.89	14.89
1	62157	Weight Pan for Inclined Plane	5.64	5.64
1	60451	Periodic Table with Illustrations	16.70	16.70
1	61060	Metric System Chart	21.45	21.45
1	64661	Dictionary of Sci. and Tech. Terms	130.00	130.00

TOTAL	1960.87

SCIENCE TESTS

TEST 1: THE NATURE OF MATTER STUDENT HANDBOOK, PP 22-27.

TEST 2: FLUIDS STUDENT HANDBOOK, PP 13-17.

TEST 3: SIMPLE MACHINES - ATTACHED.

TEST 4: HEAT AND TEMPERATURE STUDENT HANDBOOK, PP 42-63.

MULTIPLE CHOICE
FOR THE FOLLOWING QUESTIONS PLEASE ANSWER (1-6) OR (A-F)

1.
A second class lever can be used to increase force only because

A. fulcrum is between the effort and the resistance
B. effort is between the fulcrum and the resistance
C. effort arm is longer that the resistance arm
D. resistance arm is longer than the effort arm

2.
A baseball bat is used as an example of which of the following?

A. first class lever
B. second class lever
C. third class lever
D. compound machine

3.
The purpose of a second class lever is to

A. provide a gain in effort
B. provide a gain in speed
C. provide a gain in distance
D. change the direction of the applied force

4.
A single fixed pulley will:

A. change the direction of the applied force
B. provide a mechanical advantage of more than one
C. reduce the effort needed to raise the load
D. move up and down with the load

5.
As the number of pulleys used increases the efficiency will

A. increase
B. decrease
C. not be affected
D. reach 100%

6. Which of the following would be most EFFICIENT?

A. a pulley system including two moveable pulleys
B. a pulley system including two fixed pulleys
C. a single fixed pulley
D. all of the above would be equally efficient

7. To increase the speed of a gear system; it is necessary to

A. increase the size of the driving gear
B. decrease the size of the driving gear
C. add an idler gear
D. increase the size of the driven gear

8. Gear systems can be used to produce

A. a change in direction
B. a change in force
C. a change in speed
D. all of the above

9 Gear system can be found in

A. clock mechanism
B. automotive transmissions
C. wind-up toys
D. all of the above

10. The gear system on a turbine shaft can

A. change the output force
B. change the rate of rotation
C. change the direction of the rotating shaft
D. do all of the above

11. In a belt drive system; a gain in force will occur when the

A. belt is twisted
B. driving and driven wheel are of equal diameter
C. driven wheel has a larger diameter than the driving wheel
D. driving wheel has a larger diameter than the driven wheel

12. Belt drive systems can produce a change in

A. force
B. speed
C. direction
D. all of the above

13. To get a 50 lb. bale of hay into a loft a farmer would probably use a

A. hydraulic press
B. single fixed pulley
C. second class lever
D. third class lever

14. A pulley system is 60% efficient. How much work will it do if 200 ft. lb. of work is put in?

A. 333 1/3 ft. lb.
B. 6,000 ft. lb.
C. 160 ft. lb.
D. 120 ft. lb.

15. As shown in the diagram; if the load is lifted to a height of 3 inches; the effort would move:

A. 1 inch
B. 3 inches
C. 9 inches
D. 6 inches

16. When a glass of beer is lifted from a table the arm is acting as a

A. first class lever
B. second class lever
C. third class lever
D. fourth class lever

17. When calculating the amount of effort required to move any object using a lever you must consider

A. the length of the lever
B. the shape of the lever
C. the weight of the lever
D. all of the above

18. The effort arm and the resistance arm of the lever are most like the

A. circumference and pitch on the screw
B. distance and length of the wedge
C. height and distance of the inclined plane
D. diameters of the wheel and axle

19. The wheel and axle is like a first class lever in that it can

A. give a gain in effort
B. give a gain in speed
C. change the direction of the applied force
D. all of the above

20. A man uses a lever having a mechanical advantage of 4 to move a 500 pound mass. The effort applied by the man is

A. increased 4 times
B. reduced 4 times
C. increased by 1/4
D. 2,000 pounds

21. When the driving wheel has a greater diameter than the driven wheel there will be a

A. gain in speed of rotation
B. gain in force
C. loss in speed of rotation
D. change in direction

22. To determine the theoretical mechanical advantage of a pulley system one could

A. count the number of moveable pulleys
B. use the ratio of the resistance to the effort
C. count the number of fixed pulleys
D. count the number of ropes that support the resistance

23. In a belt drive system; a small diameter on the driven wheel will give a

A. gain in force
B. gain in the speed of rotation
C. loss in speed of rotation
D. change in direction

24. If there are five supporting ropes in a block and tackle pulley system; then the theoretical mechanical advantage is

A. 1
B. 5
C. 1/5
D. 6

25. The simple machine that turns the generator or alternator in most cars is called a

A. belt drive
B. chain and sprocket
C. battery
D. radiator

26. When using two interlocking gears; a gain in force can be achieved if the driving gear has 40 teeth and the driven gear has

A. 40 teeth
B. 20 teeth
C. 10 teeth
D. 60 teeth

27.
The advantage of a pulley system when lifting heavy objects is to

A. reduce the amount of effort required
B. move the object in the same direction as the applied force
C. move the object in the opposite direction as the applied force
D. all of the above

28.
Which of the following statements is true for the Third Class Lever?
The fulcrum is always found

A. at one end
B. between the resistance and the effort
C. between the effort and the resistance
D. near the centre of the lever

29.
If the diameter of the driving wheel is 50 cm and the diameter of the driven wheel is 5 cm; the TMA would be

A. 0.1
B. 10
C. 55
D. 250

30.
If the diameter of the driving wheel is 10 cm and the diameter of the driven wheel is 30 cm; the theoretical mechanical advantage is

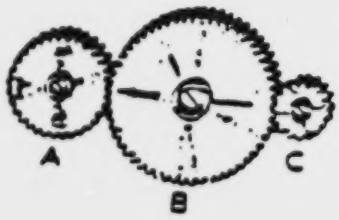
A. 3
B. 1/3
C. 20
D. 40

31. QUESTION = 18205
Calculate the Mechanical Advantage of a crowbar that can lift a rock weighing 540 N if the effort applied is 90 N.
(ignore the weight of the lever.

A. 1/6
B. 6
C. 80
D. 630

32. QUESTION = 21105
In the diagram; identity the driven wheels.

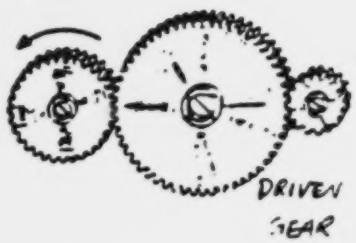
A. wheels A and B
B. wheels A and C
C. wheels B and C
D. wheels A, B and C



Driver

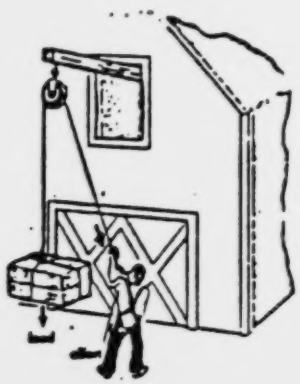
33. QUESTION = 20211
In the diagram shown; this gear system

A. gives a loss in speed
B. gives a gain in force
C. reverses direction of rotation
D. all of the above are true



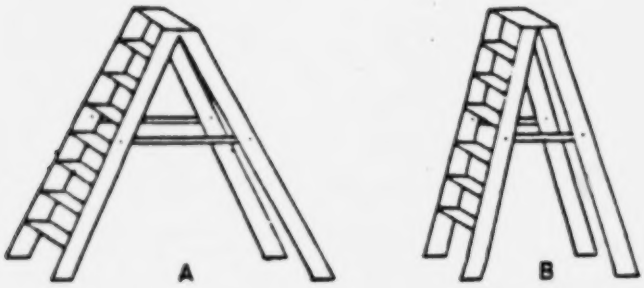
34. QUESTION = 19103
The advantage of the pulley system shown is that it will give a

A. change in direction
B. gain in speed
C. gain in distance
D. loss in force



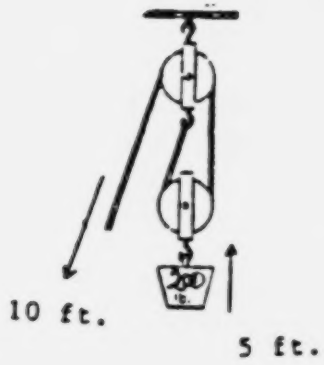
35.
Which ladder is the most difficult and unsafe to climb?

A. A
B. B
C. both A and B are equally difficult and unsafe
D. insufficient information



36.
For the pulley system shown; find the effort required to move the load, given an efficiency of 80%

A. 90 lb.
B. 20 lb.
C. 40 lb.
D. 125 lb.



37.

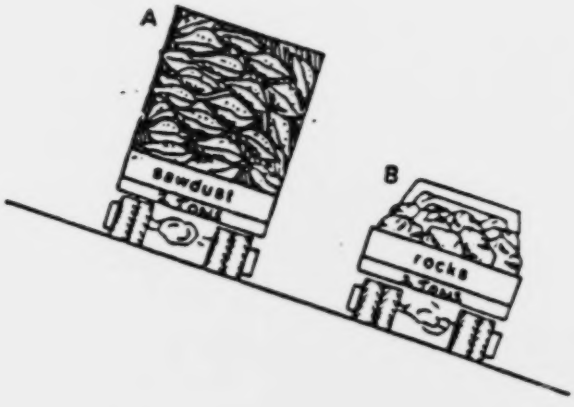
On the spoon shown; which point would best represent the location of the centre of gravity?

A. A
B. B
C. C
D. D

38.

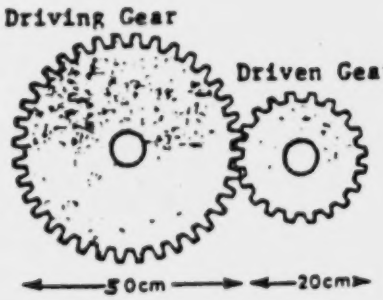
Which truck is more likely to tip over on the hillside?

A. A
B. B
C. since both are the same weight they are both likely to tip over
D. insufficient information



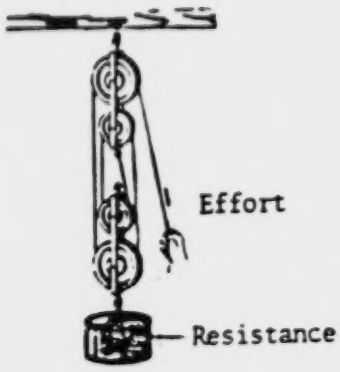
39. QUESTION = 18203
On the diagram shown, the Mechanical Advantage would be

A. 2/5
B. 2 1/2
C. 6
D. 10



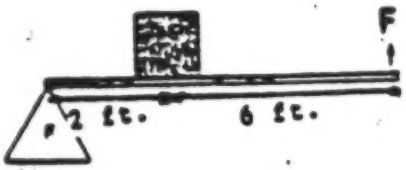
40. QUESTION = 19204
What is the theoretical mechanical advantage of the pulley system shown?

A. 3
B. 4
C. 5
D. 6



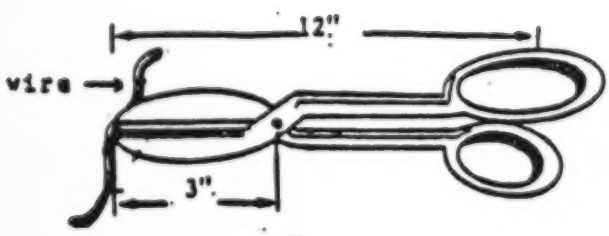
41. QUESTION = 18303
Considering the diagram; calculate the load that can be raised with a force of 20 lb. (neglect the weight of the lever

A. 5 lb.
B. 12 lb.
C. 60 lb.
D. 80 lb.



42. QUESTION = 18304
If the wire offers 36 lb. of resistance before it can be cut in two by the snips shown; what is the minimum effort needed?

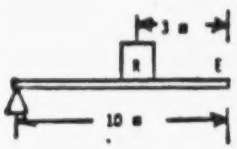
A. 3 lb.
B. 9 lb.
C. 4 lb.
D. 12 lb.



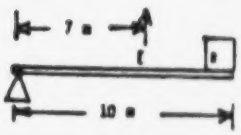
43. Which of the diagrams shown would have the greatest Mechanical Advantage?

A. A
B. B
C. C
D. D

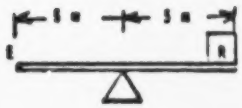
(a)



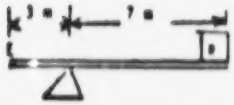
(b)



(c)

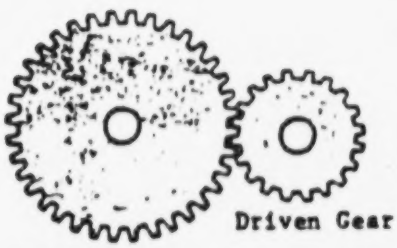


(d)



44. The theoretical mechanical advantage of the gear system shown below is

A. 0.5
B. 2
C. 20
D. 60



45.

The theoretical mechanical advantage of the gear system shown below is

A. 2.5
B. 15
C. 35
D. 0.4

46.

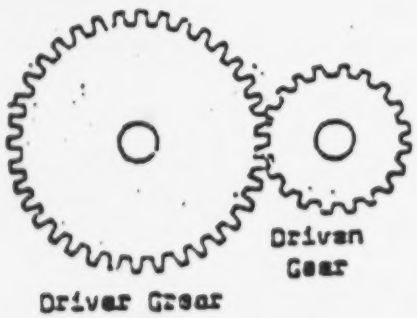
An object weighing 450 N is moved 2 m by a pulley system. An effort of 150 N is applied over a distance of eight metres. The efficiency is

A. 40 %
B. 75 %
C. 133 %
D. 6 %

47.

If a gear system consists of only two gears; the direction of rotation of the driven gear is

A. opposite to the driving gear
B. the same as the driving gear
C. determined by the arrangement of the gears
D. cannot be determined



48.

Which of the following levers is correctly labeled for Effort Arm = EA; Resistance Arm=RA; Fulcrum = F; Effort = E and Resistance = R

A. A
B. B
C. C
D. D